

11-4403-cv

United States Court of Appeals *for the* Second Circuit

AEGIS INSURANCE SERVICES, INC., LIBERTY INSURANCE
UNDERWRITERS, INC., NATIONAL UNION INSURANCE COMPANY OF
PITTSBURGH, NUCLEAR ELECTRIC INSURANCE LIMITED, CERTAIN
UNDERWRITERS AT LLOYDS, (Syndicates 1225 and 1511), as subrogor of
Consolidated Edison Company of New York, Inc., and CONSOLIDATED
EDISON COMPANY OF NEW YORK, INC.

Plaintiffs-Appellants,

(For Continuation of Caption See Inside Cover)

ON APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

JOINT APPENDIX Volume 14 of 16 (Pages JA-3617 to JA-3886)

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v.

7 WORLD TRADE COMPANY, L.P.,

Defendant-Cross-Defendant-Cross-Claimant-Third-Party Plaintiff-Appellee,

CITIGROUP INC., CITIGROUP GLOBAL MARKETS HOLDINGS INC.,
SALOMON SMITH BARNEY HOLDINGS, INC., SALOMON INC.,
SILVERSTEIN DEVELOPMENT CORP., SILVERSTEIN PROPERTIES, INC.,

Defendants-Cross-Defendants-Cross-Claimants-Appellees,

TISHMAN CONSTRUCTION CORPORATION,

Defendant-Cross-Defendant-Appellee,

OFFICE OF IRWIN G. CANTOR, P.C., FLACK & KURTZ, INC.,

Defendants-Cross-Defendants-Third-Party Defendants-Appellees,

SWANKE HAYDEN CONNELL ARCHITECTS, SYSKA & HENNESSY
GROUP, INC., AKA SYSKA & HENNESSY ENGINEERS,

Defendants-Cross-Defendants-Cross-Claimants-Third-Party Plaintiffs,

H.O. PENN MACHINERY CO., INC., ALL FIRE SYSTEMS, INC.,

Defendants-Cross-Defendants-Cross-Claimants,

GRACE CONSTRUCTION PRODUCTS, EMERY ROTH & SON, P.C.,
SECURITAS AB, SECURITY SERVICES, INC., CENTIFUGAL
ASSOCIATES, INC., SYSKA & HENNESSY, INC.,

Defendants-Cross-Defendants,

AMBASSADOR CONSTRUCTION CO., INC., COSENTINI ASSOCIATES
INC., CANTOR SEINUK GROUP, P.C., SKIDMORE OWINGS AND
MERRILL, L.L.P., AMBASSADOR CONSTRUCTION CO., INC., AMEC
CONSTRUCTION MANAGEMENT, INC., FKA MORSE DIESEL
INTERNATIONAL, INC.,

Defendants-Cross-Defendants-Third-Party Defendants,

DIC/UNDERHILL, a joint venture, KABACK ENTERPRISES, PREFERRED
UTILITIES MANUFACTURING CORP., ELECTRIC POWER SYSTEMS,
INC., G.C. ENGINEERING & ASSOCIATES, P.C., FIRECOM INC.,
FIBERLOCK TECHNOLOGIES, INC., ROSEWACH TANK CO., INC.,
ABCO PEERLESS SPRINKLER CORPORATION, AMR CORPORATION,
AMERICAN AIRLINES, INCORPORATED, UAL CORPORATION, UNITED
AIRLINES INCORPORATED, COLGAN AIR, INCORPORATED, US
AIRWAYS GROUP, INCORPORATED, US AIRWAYS, INCORPORATED,
HUNTLEIGH USA CORPORATION, ICTS INTERNATIONAL NV, GLOBE

AVIATION SERVICES CORPORATION, BURNS INTERNATIONAL
SECURITY SERVICES CORPORATION, PINKERTON'S INCORPORATED,
BOEING COMPANY, AMEC, PLC, KABACK ENTERPRISES,

Defendants,

THE WTC PLAINTIFFS,

Plaintiff-Intervenor.

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Exhibit 29: Excerpts of Deposition Exhibit Geata-2, which was Marked as an Exhibit at Gerard Gaeta’s Deposition, Dated February 28, 2008	JA-1839
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Exhibit 33: Deposition Exhibit Glass-4, which was Marked as an Exhibit at John Glass’ Deposition, Dated November 11, 2008	JA-1858
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Exhibit 35: Excerpts of the Transcript of the Deposition Testimony of Chi Chu, Dated November 20, 2008	JA-1861

Exhibit 36: Deposition Exhibit Borsari-10, which was Marked as an Exhibit at Carl Borsari's Deposition, Dated February 22, 2008.....	JA-1864
Exhibit 37: Deposition Exhibit Chu-2, which was Marked as an Exhibit at Chi Chu's Deposition, Dated November 20, 2008	JA-1865
Exhibit 38: News Article Published by The New York Times on November 13, 1997, Entitled "The Trade Center Verdict: The Overview; 'Mastermind' and Driver Found Guilty in 1993 Plot to Blow Up Trade Center"	JA-1879
Exhibit 39: Deposition Exhibit Ritorto-9, which was Marked as an Exhibit at Joseph Ritorto's Deposition, Dated August 7, 2008	JA-1883
Exhibit 40: Deposition Exhibit Weems-4, which was Marked as an Exhibit at Walter Weems' Deposition, Dated December 13, 2007.....	JA-1886
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Exhibit 68: Second Amended Complaint, Filed July 11, 2008 (Omitted Here but Reproduced at p. JA-704)	JA-2026
Exhibit 69: Answer of 7 World Trade Company, L.P., Silverstein Properties, Inc., and Silverstein Development Corp. to the Second Amended Complaint, with Cross- Claims and Third-Party Claims, filed August 6, 2008 (Omitted Here but Reproduced at p. JA-764)	JA-2027
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Exhibit B: Photograph of the East Side of 7 World Trade Center	JA-2150
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Exhibit B: Closure Report for Transformer Oil Release at 7 World Trade Center, Dated January 2004.....	JA-2258
Exhibit C: Excerpts of the Transcript of the Deposition Testimony of Anthony Varriale, Dated June 9, 2009	JA-2264
Exhibit D: Excerpts of the Transcript of the Deposition Testimony of Phillip C. Ruvolo, Dated June 12, 2009	JA-2267
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Exhibit F: Excerpts of the Transcript of the Deposition Testimony of Colvin Cox, Dated July 31, 2007	JA-2271
Exhibit G: Excerpts of the Transcript of the Deposition Testimony of John S. Spiech, Dated May 27, 2009.....	JA-2273
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Exhibit B: Selected Publication List of Craig L. Beyler, Ph.D....	JA-2326
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Exhibit D: Excerpts of Electric Power Generation Transmission Distribution Manual	JA-2433
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Exhibit 2: Three Party Agreement Among Salomon Inc., Silverstein, and Port Authority, Dated November 23, 1988	JA-2458
Exhibit 3: GZA GeoEnvironmental Inc., Underground Storage Tank Closure Report, Dated September 9, 2002	JA-2466

Exhibit 4: Excerpts of the Transcript of the Deposition Testimony of Eugene Fasullo, Dated April 11, 2008(Further Supplementing Santillo Declaration Exhibit 14, Dated December 18, 2007).....	JA-2490
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Exhibit 14: Con Edison September 11, 2001 Restoration Costs – Summary of 7 World Trade Center Damage Claim Spreadsheet, Dated May 31, 2009.....	JA-2524
Exhibit 15: Excerpts of the Transcript of the Deposition Testimony of Anthony Varriale, Dated June 9, 2009 (Further Supplementing Santillo Declaration Exhibit 36).	JA-2526
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Exhibit 17: Excerpts of the Transcript of the Deposition Testimony of Joseph Meola, Dated June 24, 2009	JA-2535
Exhibit 18: Excerpts of the Transcript of the Deposition Testimony of Mark Giannini, Dated June 29, 2009.....	JA-2539
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2. Supplemental and Amended Second Declaration of Joseph P. Colaco, Dated April 1, 2010, with Exhibits	JA-2584
3. Supplemental and Amended Second Declaration of Kenneth Elovitz, Dated April 1, 2010, with Exhibits.....	JA-2600
4. Supplemental and Amended Second Declaration of Frederick W. Mowrer, Dated April 1, 2010, with Exhibits.....	JA-2613

5. Supplemental and Amended Second Declaration of Guy Nordenson, Dated April 1, 2010, with Exhibits.....	JA-2639
6. Supplemental and Amended Second Declaration of Joseph M. Sorge, Dated April 1, 2010, with Exhibit.....	JA-2655
7. Supplemental and Amended Declaration of Jose L. Torero, Dated April 1, 2010, with Exhibit.....	JA-2664
Declaration of Franklin M. Sachs, Esq. in Support of Plaintiffs' Motion for Leave to File Supplemental and Amended Expert Declarations Incorporating Plaintiffs' Expert Reports Pursuant to Fed. R. Civ. P. 56(e)(1) in Further Opposition to the Motions for Summary Judgment of Silverstein and Citigroup, Filed April 6, 2010, with the Following Attached Exhibits	JA-2698
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Exhibit 2: Reply Brief in Support of Motion by Defendants 7 World Trade Company, L.P., Silverstein Development Corp. and Silverstein Properties Inc. for Summary Judgment Dismissing All Claims, Dated March 19, 2010.	JA-2704
Exhibit 3: Declaration of Sheela V. Pai, Esq. in Support of Motion for Summary Judgment, Dated March 19, 2010, with Exhibits.....	JA-2713
Exhibit 4: Declaration of Craig L. Beyler, Dated March 18, 2010, with Exhibits.....	JA-2736
Exhibit 5: Citigroup Inc. and Citigroup Global Markets Holdings, Inc.'s Reply Memorandum of Law in Support of the Motion for Summary Judgment, Dated March 19, 2010	JA-2773
Exhibit 6: Declaration of Megan M. St. Ledger, Esq. in Further Support of Citigroup Inc. and Citigroup Global Markets Holdings Inc.'s Memorandum of Law in Support of the Motion for Summary Judgment, Filed March 19, 2010, with Exhibits.....	JA-2784

Exhibit 7: Declaration of Chester T. Vogel, Dated March 19, 2010, with Exhibits.....	JA-2812
Exhibit 8: Citigroup Inc. and Citigroup Global Markets Holdings Inc.’s Reply Statement of Undisputed Material Facts, Filed March 19, 2010 (Omitted Here but Reproduced at p. JA-2344).....	JA-2847
Declaration of Katherine L. Pringle, Esq. in Support of the Accompanying Opposition by Defendants 7 World Trade Company, L.P., Silverstein Development Corp. and Silverstein Properties Inc. to Plaintiffs’ Motion for Leave to File Supplemental and Amended Expert Declarations, Filed April 21, 2010, with the Following Attached Exhibits.....	JA-2848
Exhibit A: Letter from Katherine L. Pringle, Esq. to the Honorable Alvin K. Hellerstein, Dated November 12, 2009	JA-2850
Exhibit B: Second Declaration of Kenneth Elovitz, Dated January 22, 2010.....	JA-2852
Exhibit C: Excerpts of Citigroup Inc. and Citigroup Global Markets Holdings, Inc.’s Reply Memorandum of Law in Support of the Motion for Summary Judgment, Filed March 19, 2010.....	JA-2864
Supplemental and Amended Declaration of Jose L. Torero, Dated April 1, 2010, with the Following Attached Exhibits	JA-2866
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Exhibit B: Report Entitled “Analysis of the Impact of a Fire in the Mechanical Room (5 th & 6 th Floor) of the World Trade Center 7 Building,” Dated February 12, 2010.....	JA-2897
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Supplemental and Amended Second Declarations of Colin G. Bailey, Dated April 5 th and 10 th , 2010, with the Following Attached Exhibits	JA-3067
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Exhibit A: Photographs Showing Fire Protection on a Different Building	JA-3086
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Exhibit D: Response of WTC7 to Standard Office Fires and Collapse Initiation, Dated February 15, 2010, By Professor Colin Bailey	JA-3100
Supplemental and Amended Second Declaration of Frederick W. Mowrer, Filed April 22, 2010, with the Following Attached Exhibits	JA-3299
Exhibit A: Frederick W. Mowrer's Curriculum Vitae	JA-3305
Exhibit B: Photograph of the East Side of 7 World Trade Center	JA-3315
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Exhibit B: Report and Summary of Findings: Global Collapse Analysis: World Trade Center 7, Collapse Investigation, Dated February 12, 2010	JA-3900
Supplemental and Amended Second Declaration of Kenneth Elovitz, Filed April 22, 2010, with the Following Attached Exhibits	JA-4229
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Supplemental and Amended Second Declaration of Joseph M. Sorge and Curriculum Vitae, Filed April 22, 2010, with the Following Attached Exhibit	JA-4258
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Memo Endorsed Letter from Franklin M. Sachs, Esq. to the Honorable Alvin K. Hellerstein, U.S.D.J., Dated November 19, 2010	JA-4300
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Stipulation of Voluntary Dismissal of Cross-Claims, Filed November 3, 2011	JA-4393
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Memo Endorsed Letter from Katherine L. Pringle, Esq. to the Honorable Alvin K. Hellerstein, Dated November 3, 2011	JA-4397
Defendant Tishman Construction Corporation's Master Answer to Property Plaintiffs' Master Complaint Against Ground Defendants, Dated December 1, 2005	JA-4399
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Memo Endorsed Letter, Dated August 23, 2010, from Beth D. Jacob,
Esq. to The Honorable Alvin K. Hellerstein, Requesting
Removal of Exhibit 17 to the Declaration of Jemi M. Goulian,
Esq., Filed February 1, 2010, from the Public File, Signed by
Judge Hellerstein on August 24, 2010..... JA-4481

Guy Nordenson and Associates

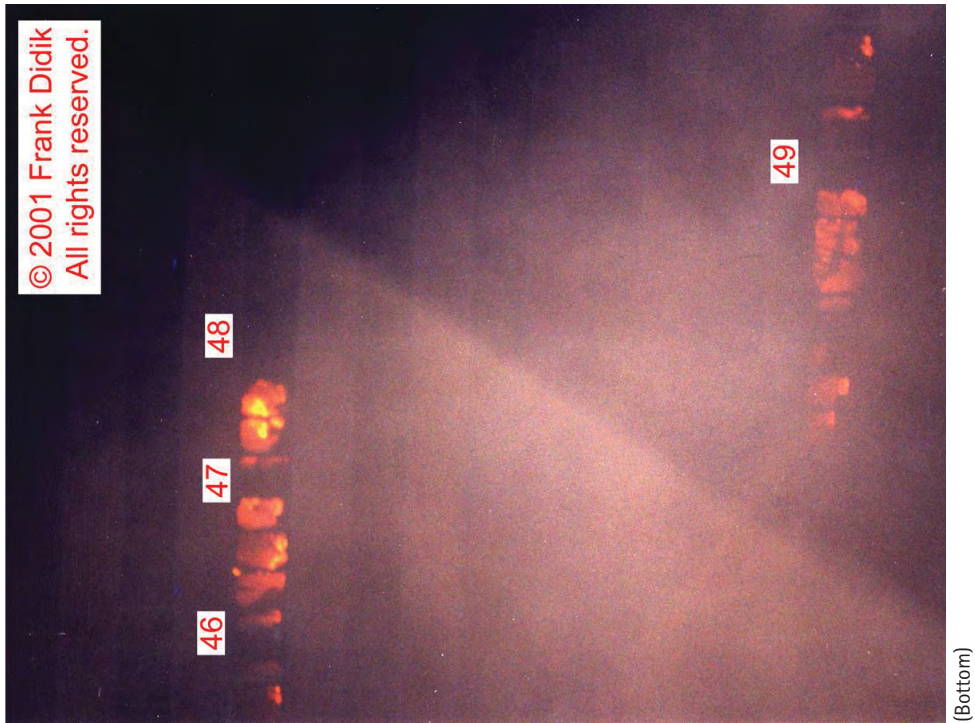


Image 6.N.07 North facade, 3:10:46PM-3:13:46PM

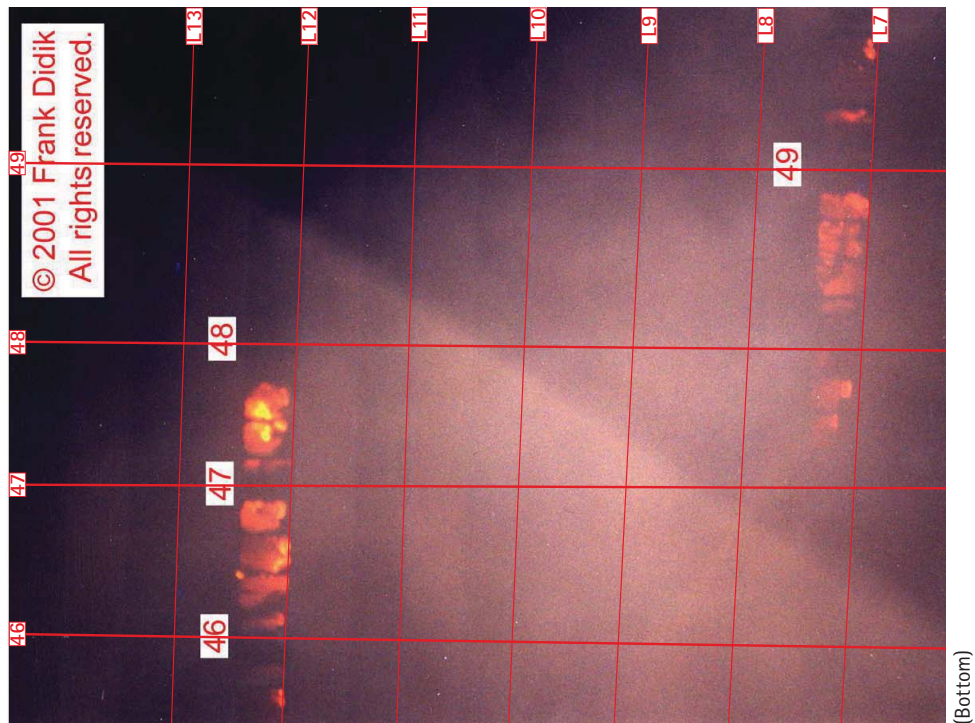


Image 6.N.07 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.08 North facade, approximately 3:10PM-3:17PM

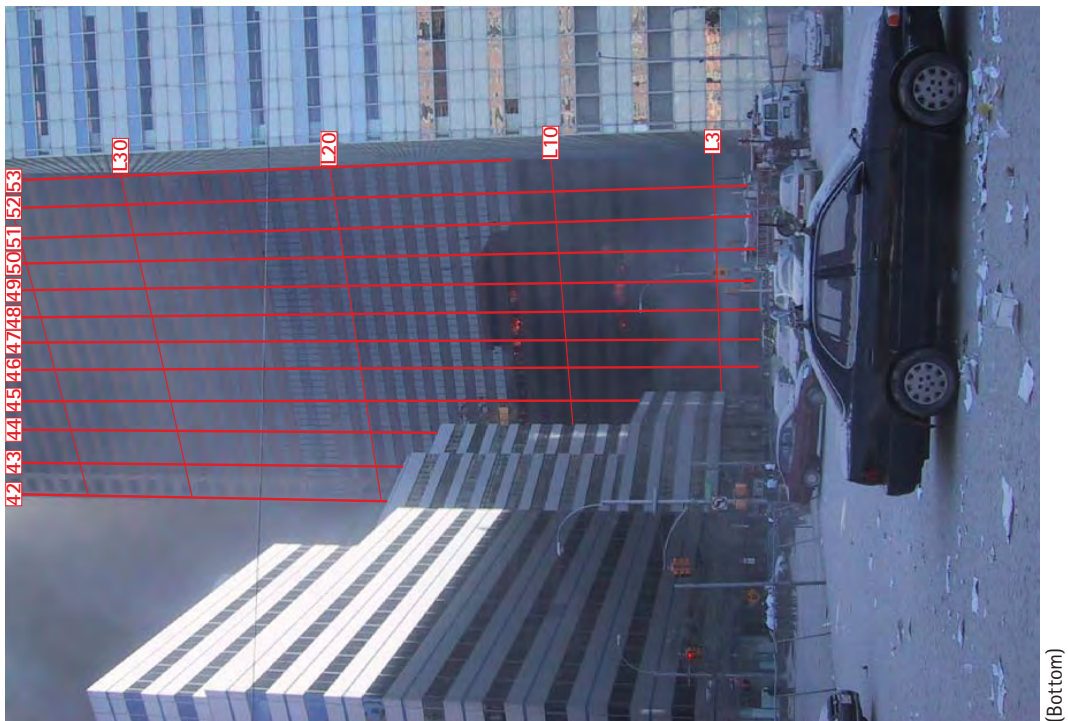
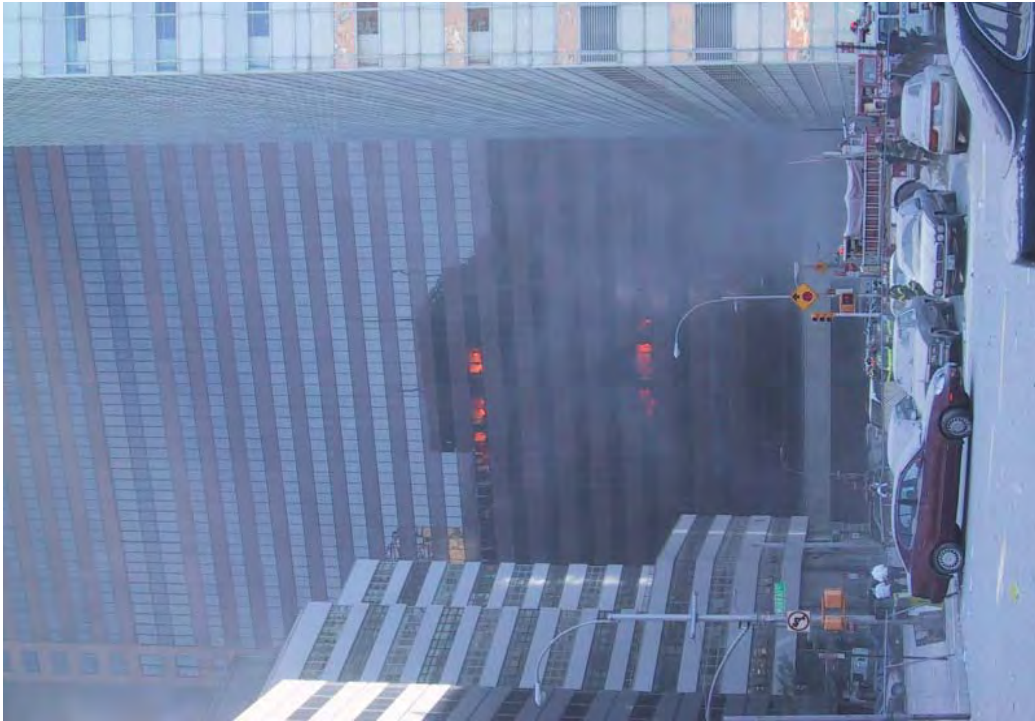


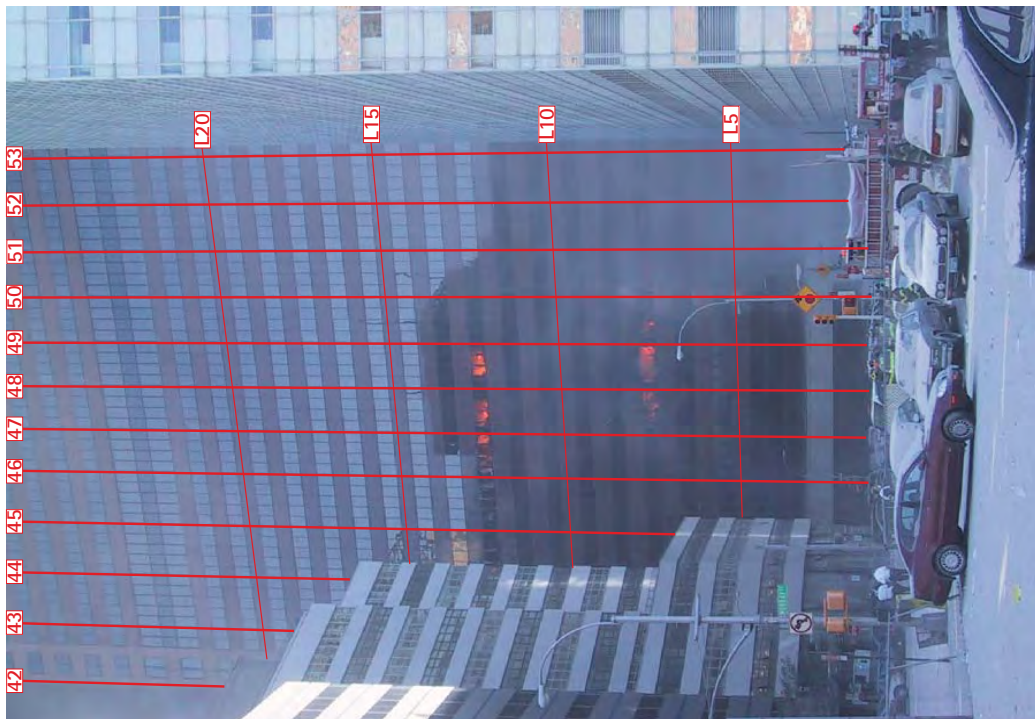
Image 6.N.08 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.N.09 North facade, 3:12:50PM +/-300S



(Bottom)

Image 6.N.09 with columns and floor levels overlaid

Guy Nordenson and Associates

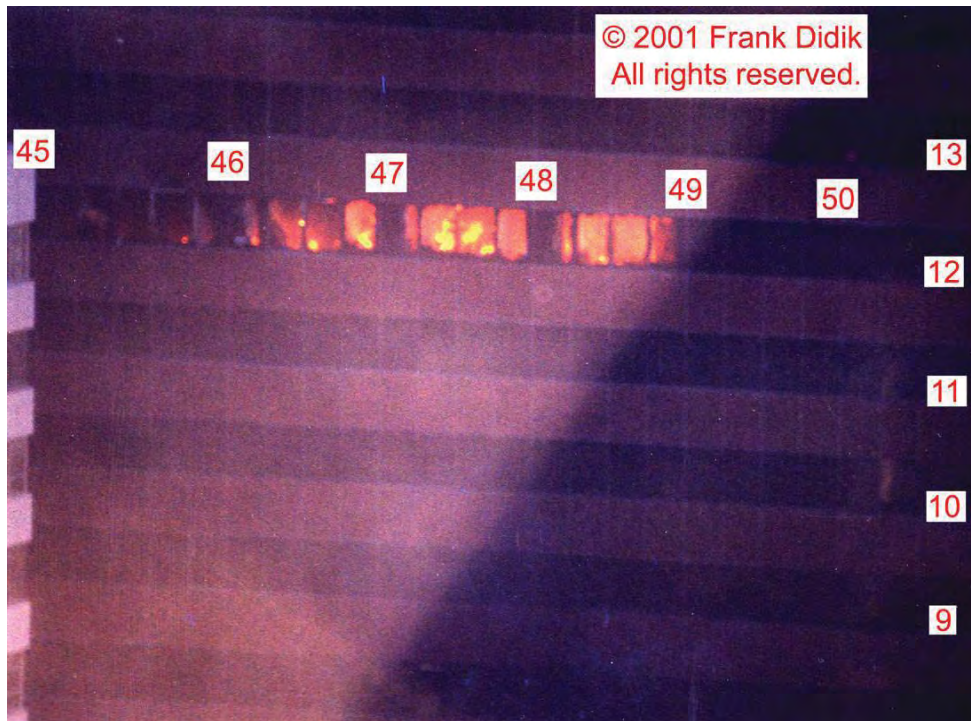


Image 6.N.10 North facade, 3:11:15PM-3:16:51PM

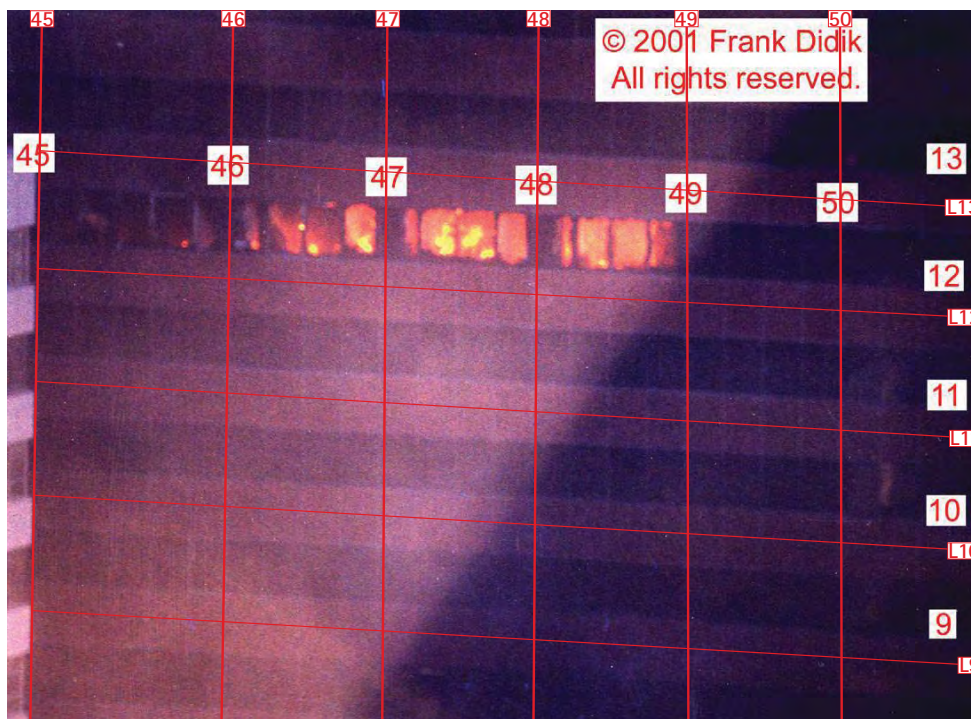


Image 6.N.10 with columns and floor levels overlaid

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Image 6.N.11 North facade, approximately 3:20PM-3:54PM

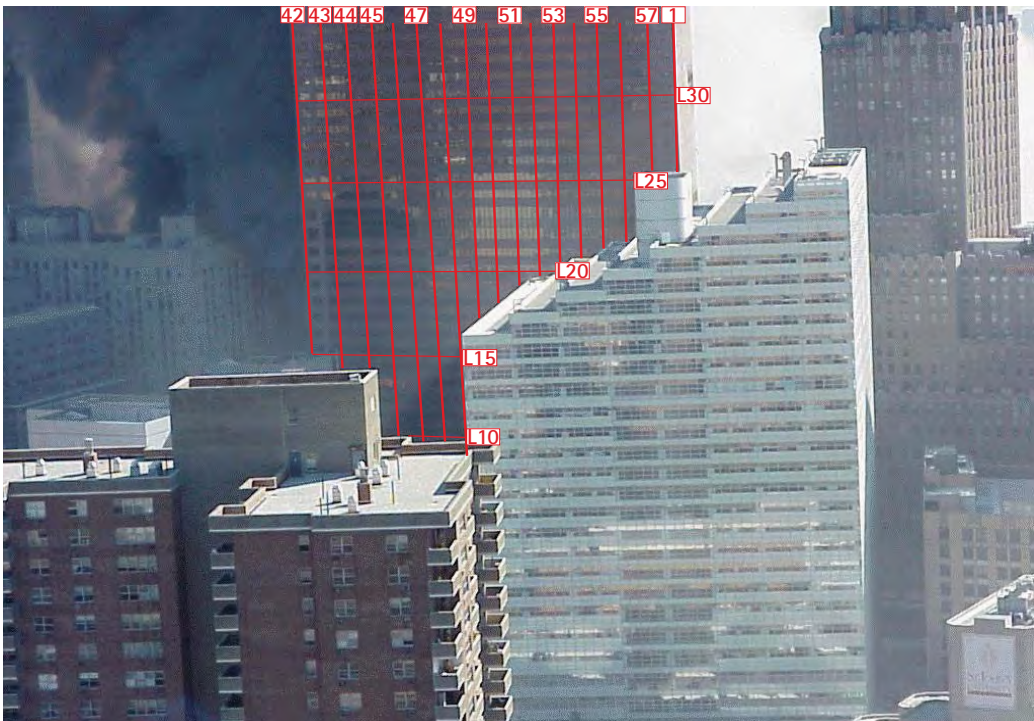


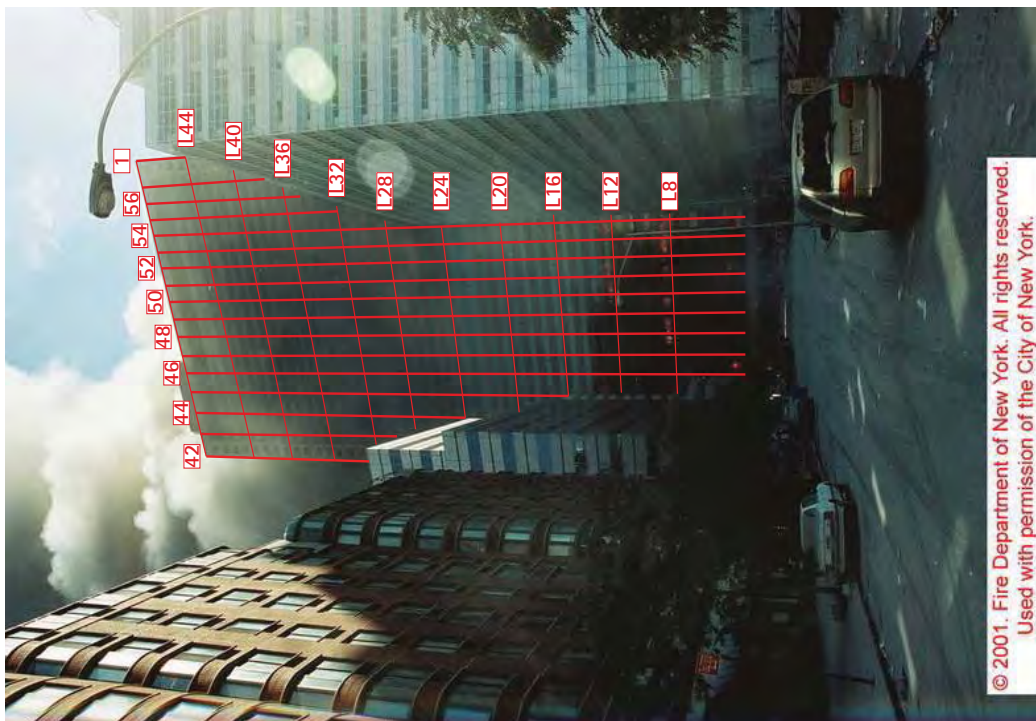
Image 6.N.11 with columns and floor levels overlaid

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(Bottom)

Image 6.N.12 North facade, 3:41PM +/-180S



(Bottom)

Image 6.N.12 with columns and floor levels overlaid

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Image 6.N.13 North facade, 3:42:30PM +/-120S

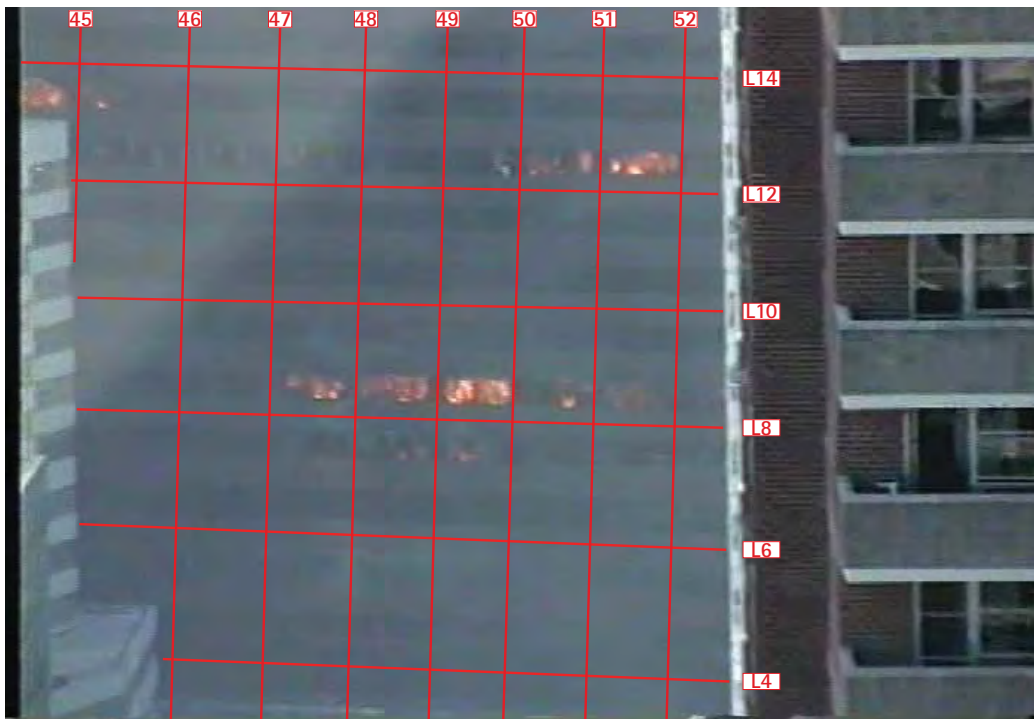


Image 6.N.13 with columns and floor levels overlaid

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Image 6.N.14 Northwest corner, around 3:42PM +/-300S



Image 6.N.14 with columns and floor levels overlaid

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Image 6.N.15 North facade, 3:44PM +/-240S



Image 6.N.15 with columns and floor levels overlaid

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Image 6.N.16 North facade, 3:50:13PM +/-180S

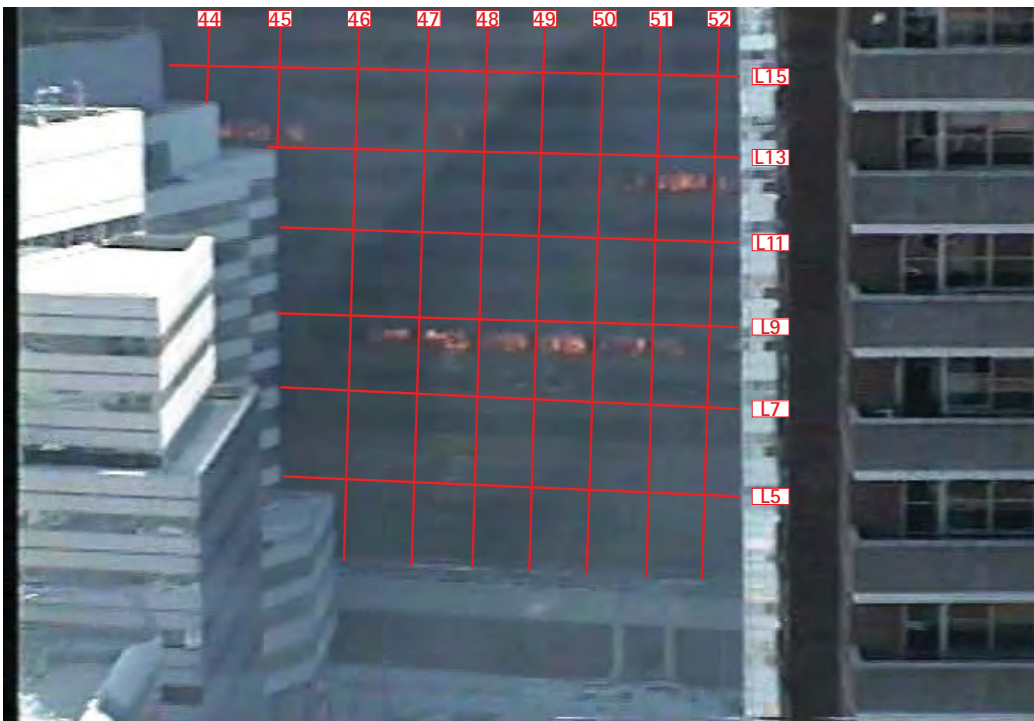


Image 6.N.16 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.17 North facade, 3:49PM-3:54PM

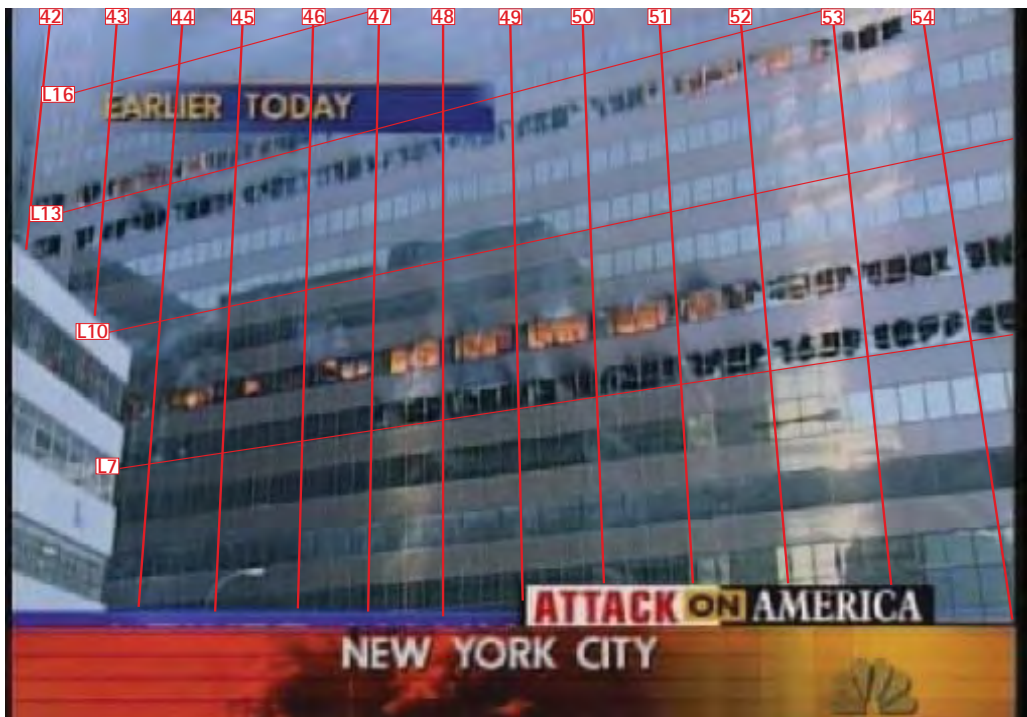


Image 6.N.17 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.18 North facade, 3:49:30PM-3:54:30PM



Image 6.N.18 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.19 North facade, 3:51PM-3:58PM



Image 6.N.19 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.20 North facade, 3:54:14PM +/-210S

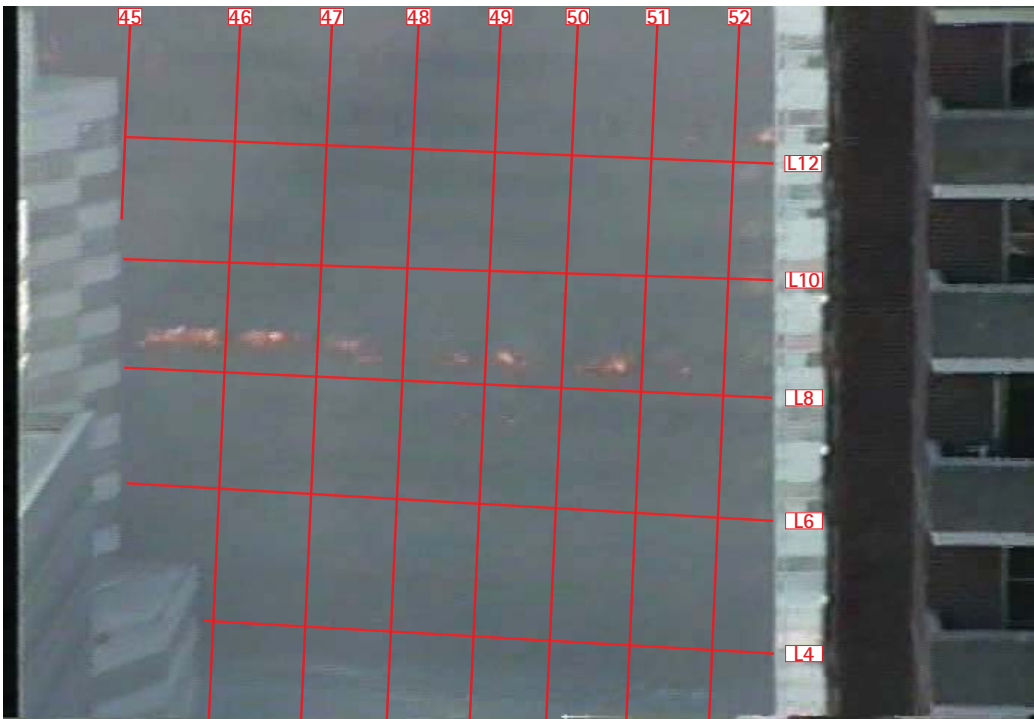


Image 6.N.20 with columns and floor levels overlaid

Guy Nordenson and Associates

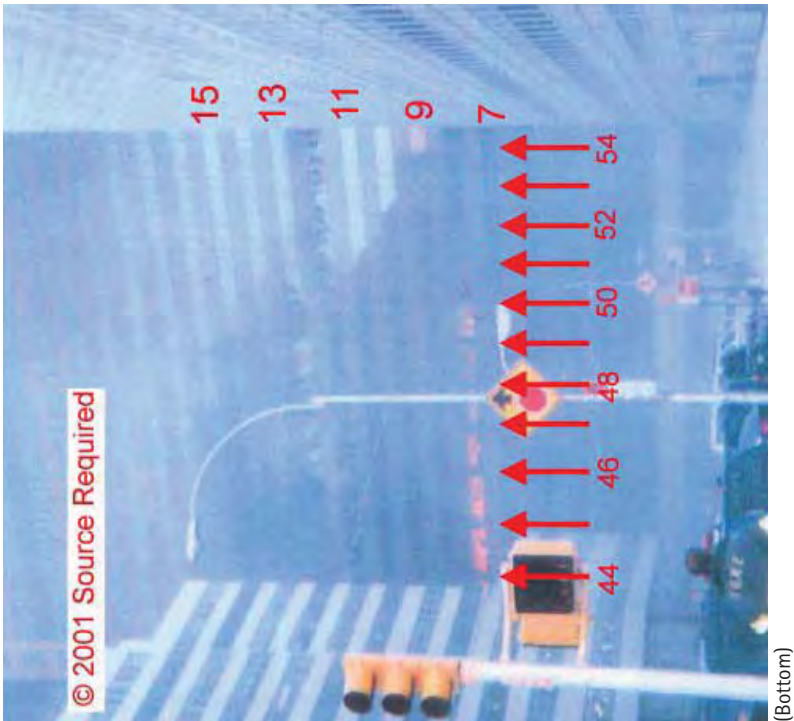


Image 6.N.21 North facade, near 3:55PM

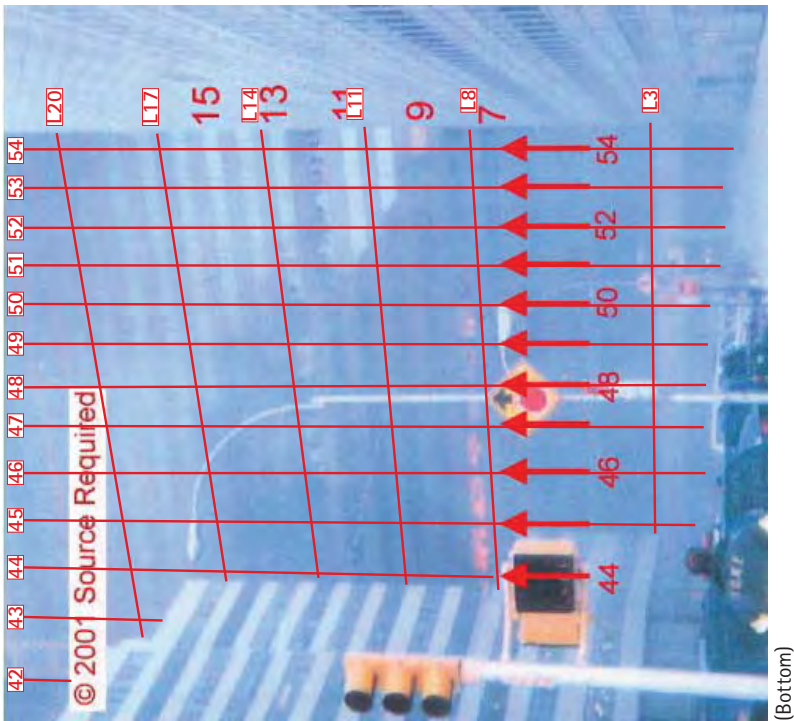


Image 6.N.21 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.22 North facade, 3:53PM-4:02PM



Image 6.N.22 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.23 Northeast corner, 3:55PM-4:04PM



Image 6.N.23 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.24 Northeast corner, approximately 3:55PM-4:04PM



Image 6.N.24 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.N.25 Northeast corner, approximately 3:55PM-4:04PM



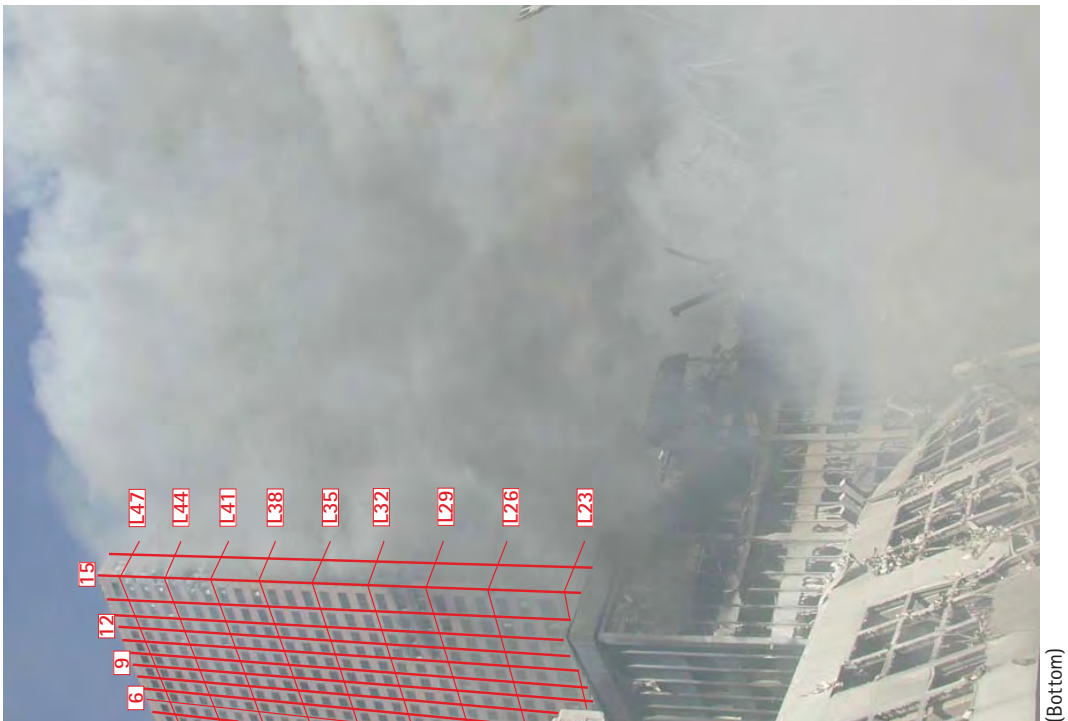
Image 6.N.25 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.01 Southwest corner, shortly after 3:00PM



(Bottom)

Image 6.W.01 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.02 Southwest corner, shortly after 3:00PM

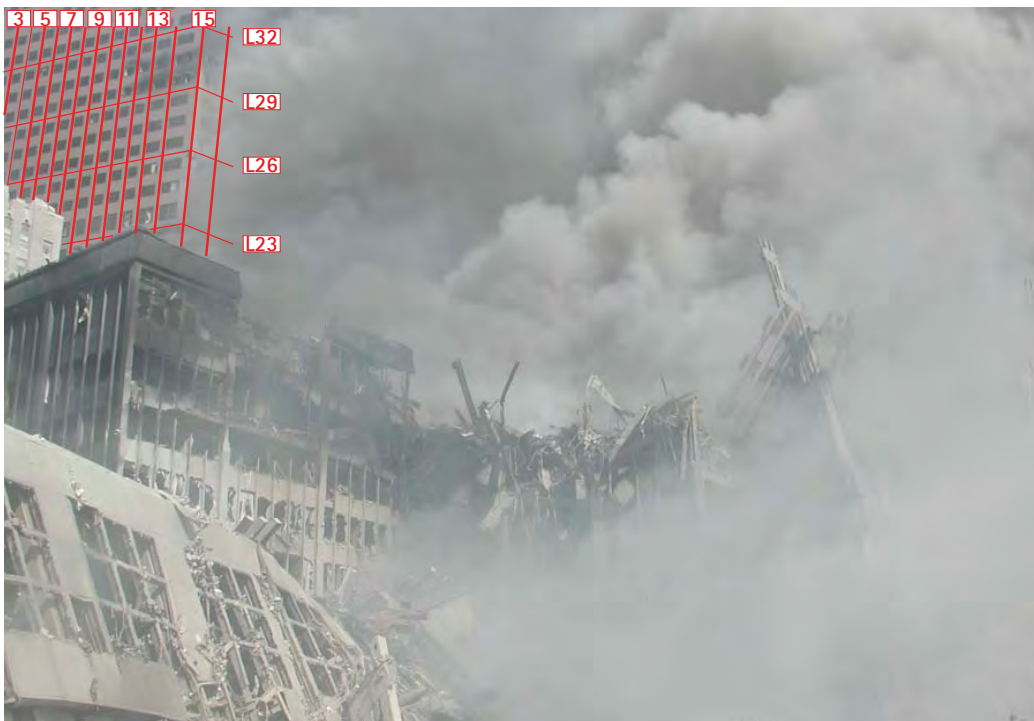


Image 6.W.02 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.03 Southwest corner, shortly after 3:00PM

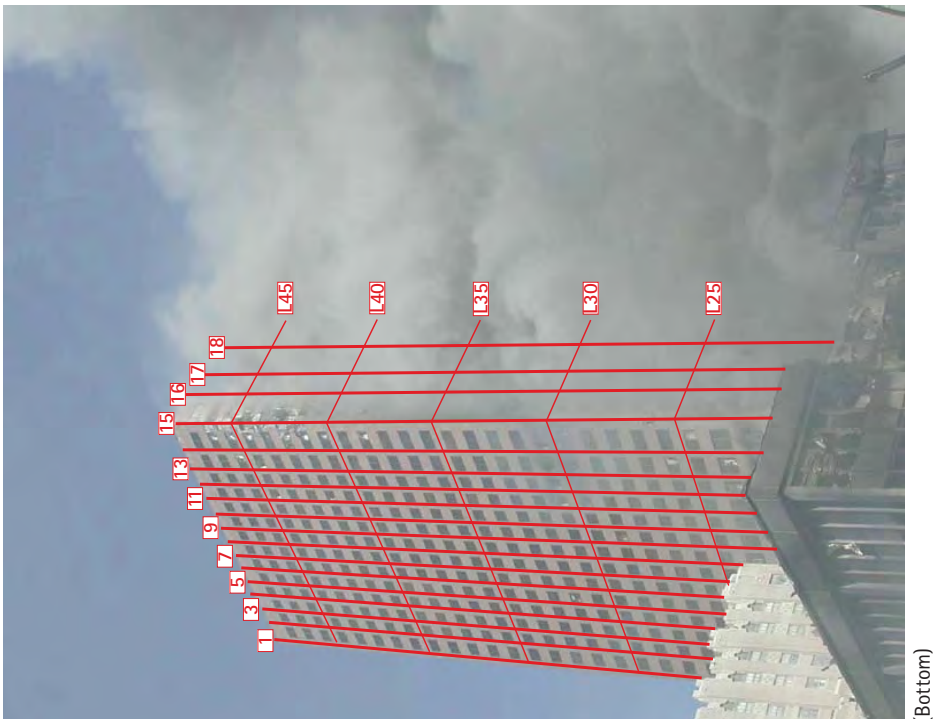


Image 6.W.03 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.04 West facade, approximately 3:00PM-4:30PM



Image 6.W.04 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.05 West facade, approximately 3:00PM-4:30PM



Image 6.W.05 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.06 Southwest corner, approximately 3:00PM-4:30PM



Image 6.W.06 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.07 West facade, approximately 3:00PM-4:30PM



(Bottom)

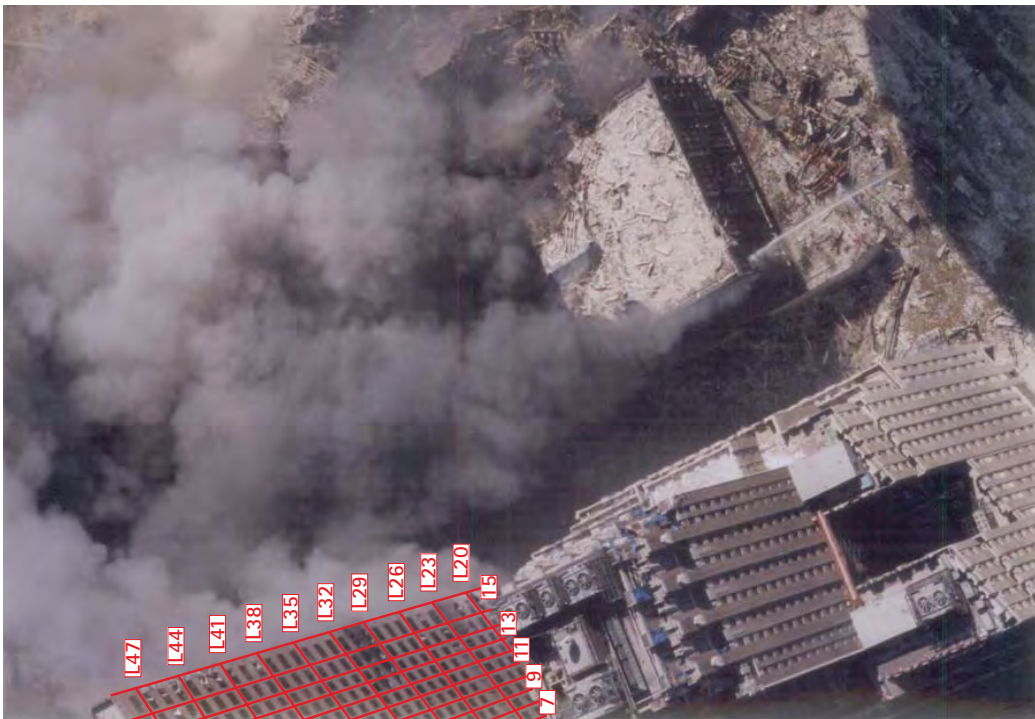
Image 6.W.07 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.08 West facade, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.08 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.09 West facade, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.09 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.10 West facade, approximately 3:00PM-4:30PM



Image 6.W.10 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.11 West facade, approximately 3:00PM - 4:30PM



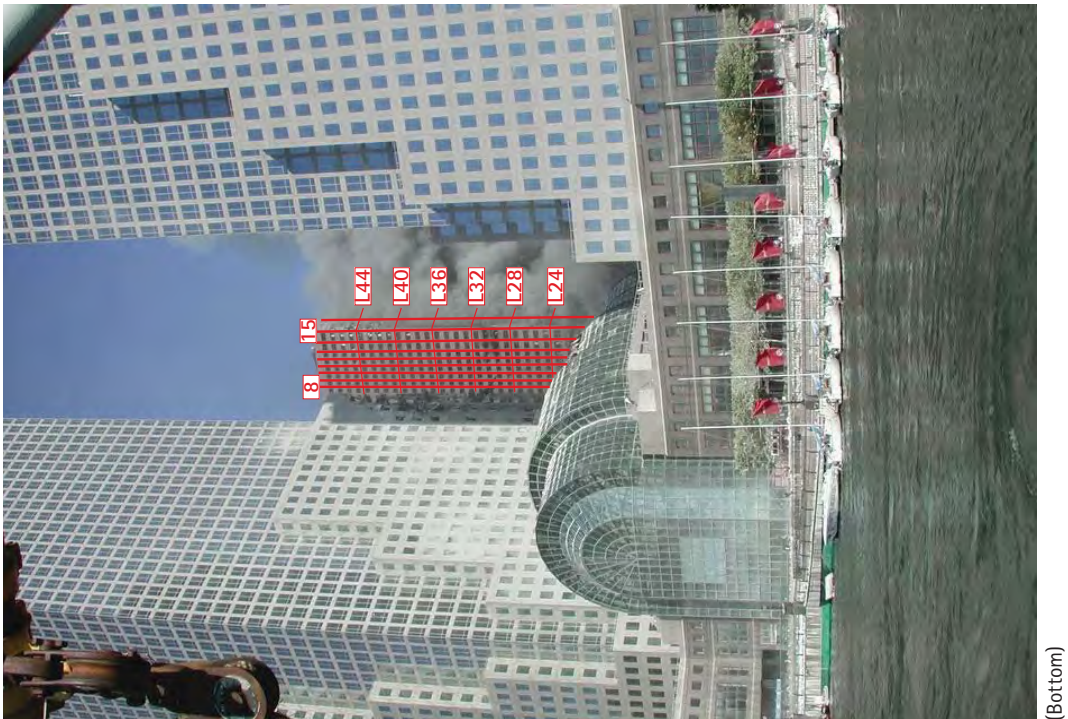
Image 6.W.11 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.12 Southwest corner, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.12 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.13 Southwest corner, approximately 3:00PM-4:30PM

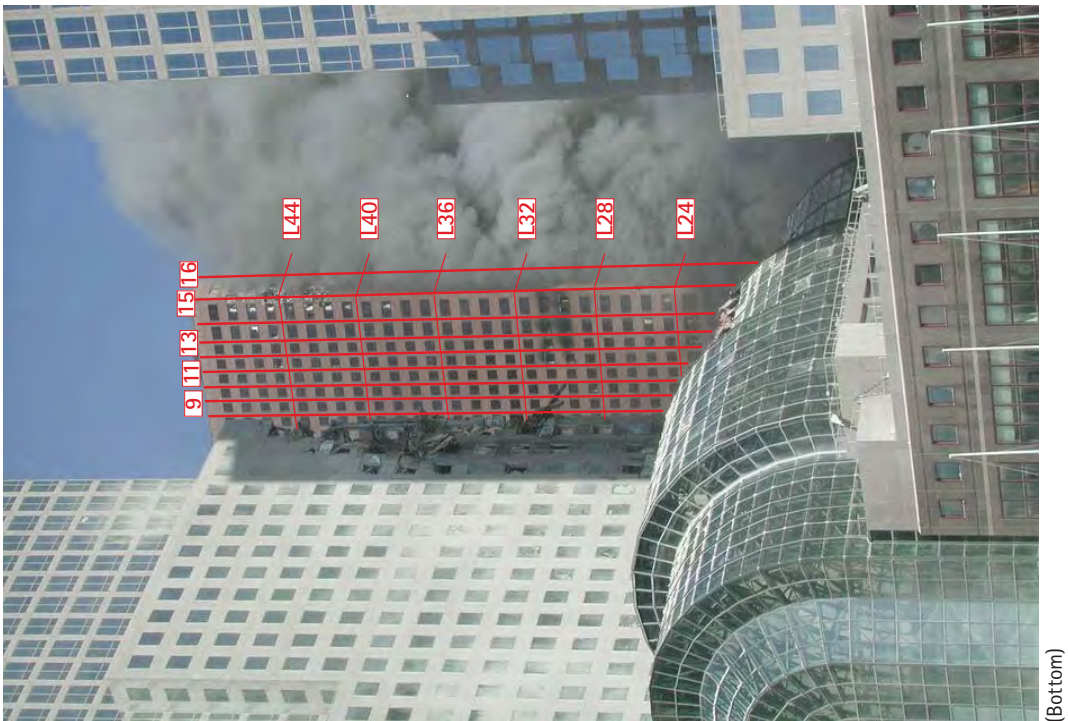


Image 6.W.13 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.14 Southwest corner, approximately 3:00PM-4:30PM



Image 6.W.14 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.15 Southwest corner, approximately 3:00PM-4:30PM



Image 6.W.15 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.16 Southwest corner, approximately 3:00PM-4:30PM



Image 6.W.16 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.17 West facade, approximately 3:00PM-4:30PM

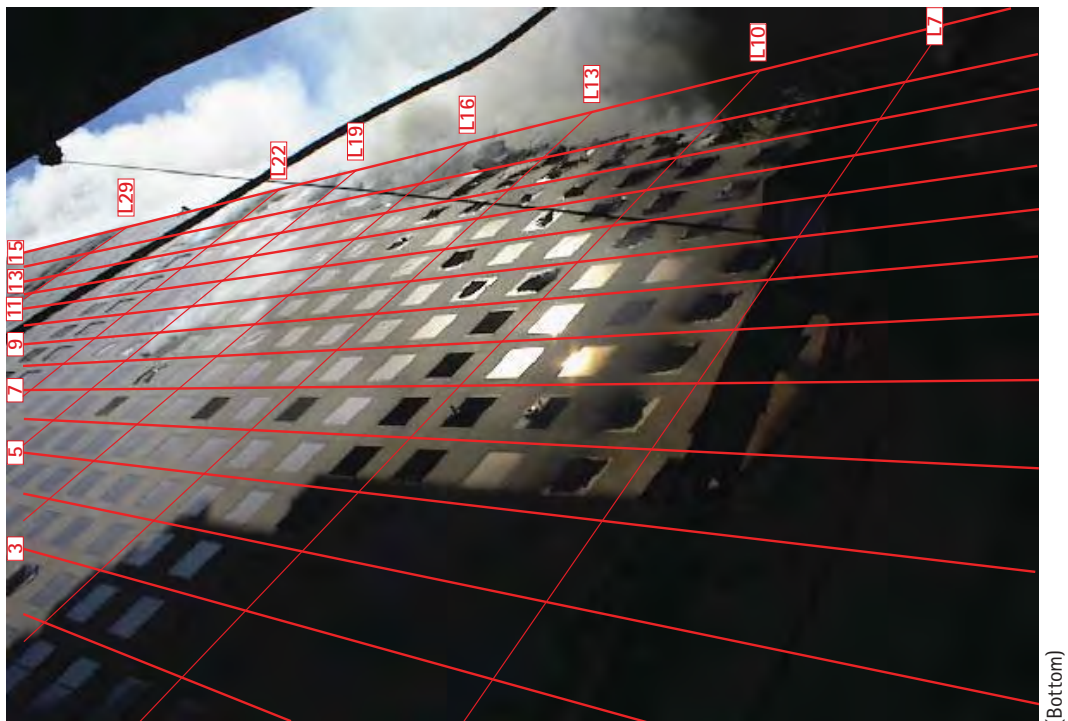


Image 6.W.17 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.18 West facade, approximately 3:00PM-4:30PM

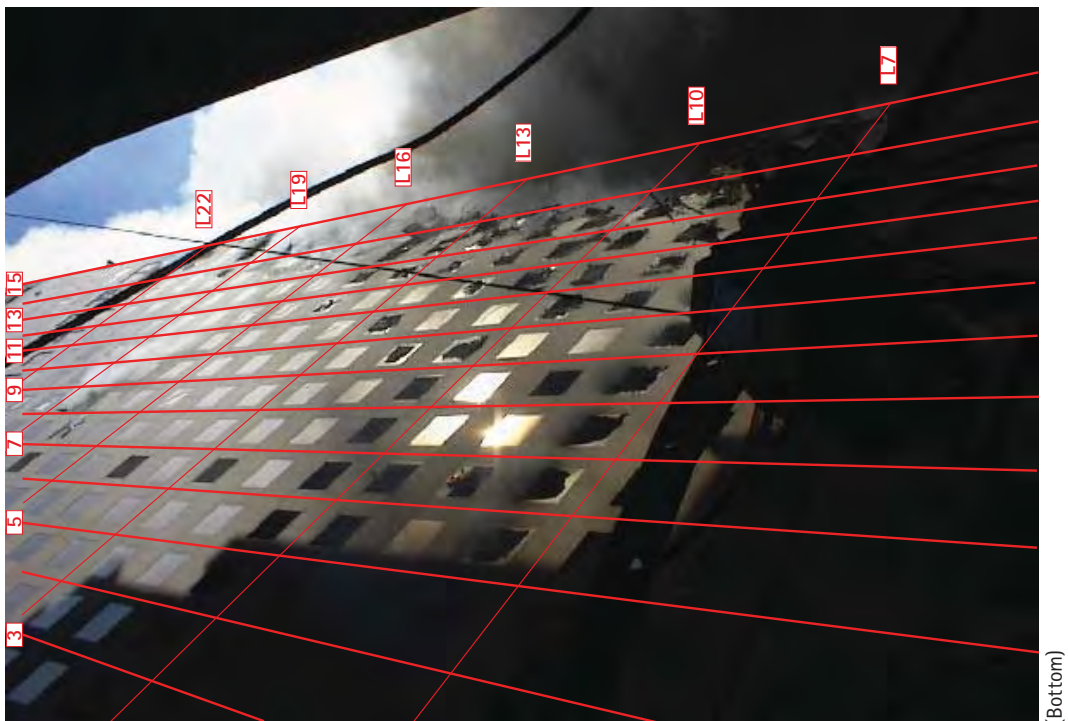


Image 6.W.18 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.19 Southwest corner, approximately 3:00PM-4:30PM

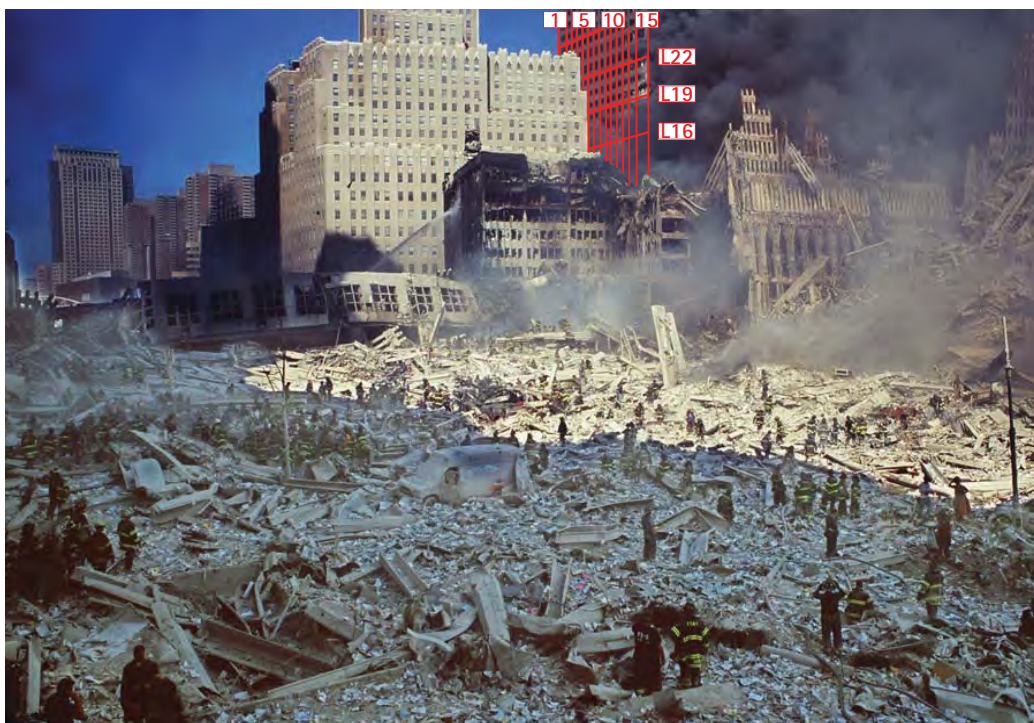


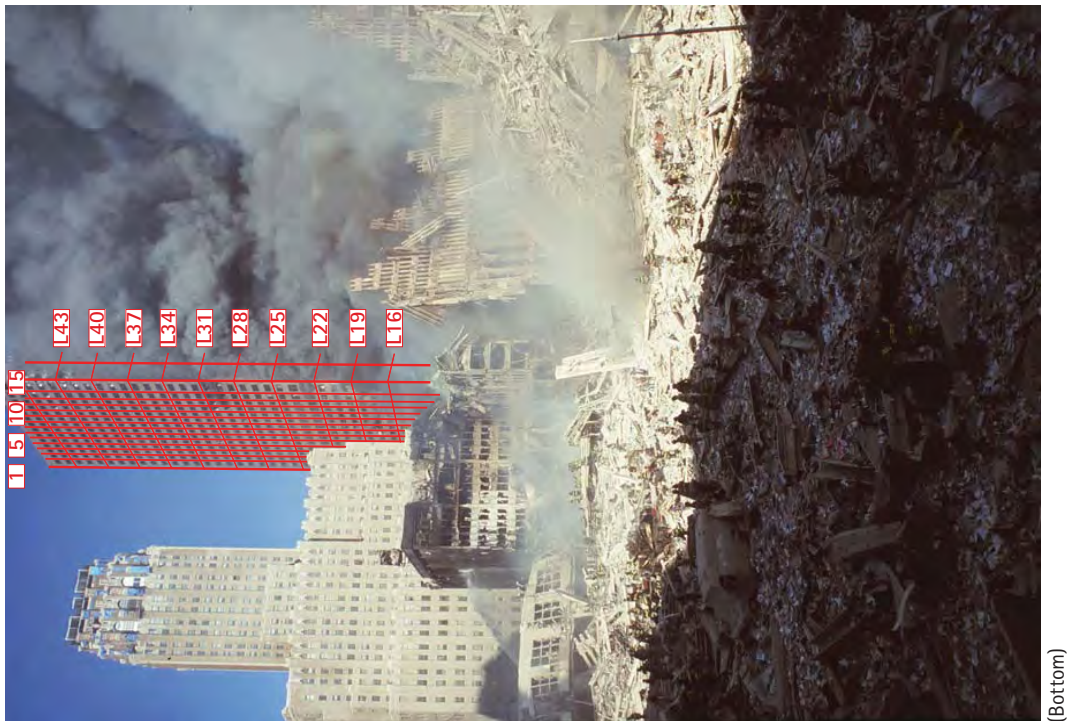
Image 6.W.19 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.20 Southwest corner, approximately 3:00PM-4:30PM



(Bottom)

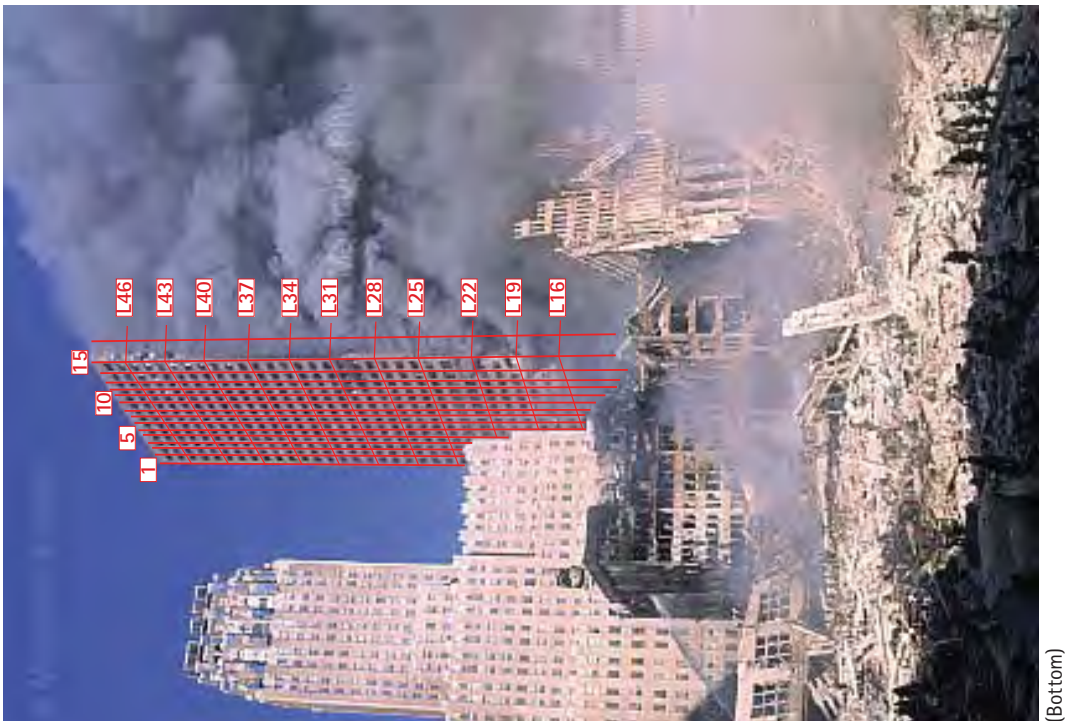
Image 6.W.20 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.21 Southwest corner, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.21 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.22 Southwest corner, approximately 3:00PM-4:30PM



Image 6.W.22 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.23 Southwest corner, approximately 3:00PM-4:30PM

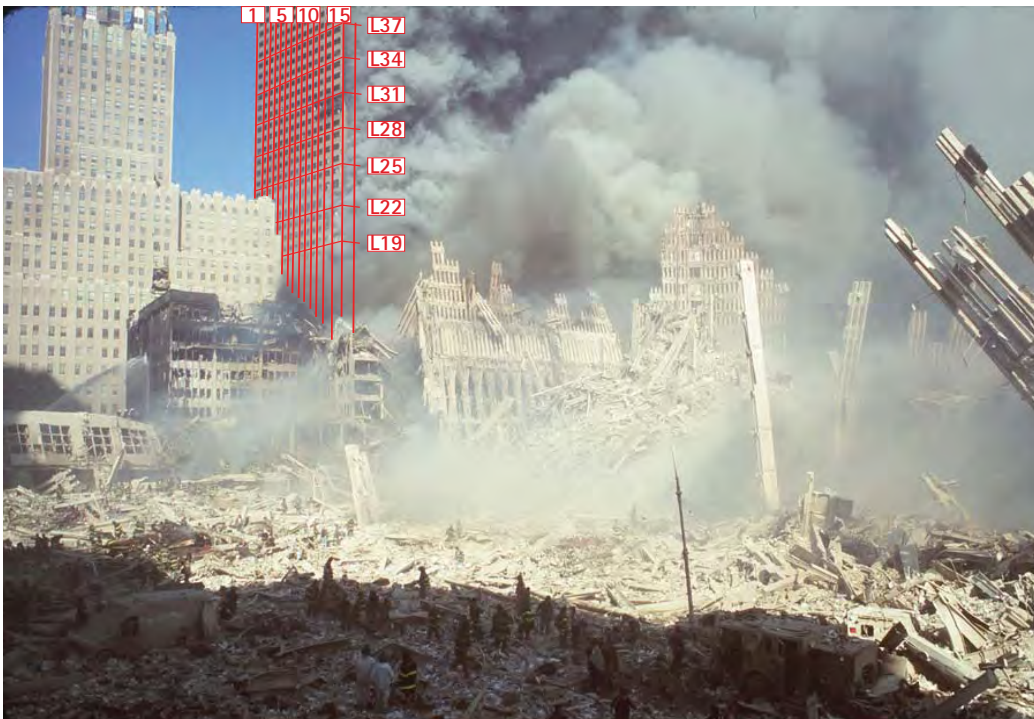


Image 6.W.23 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.24 Southwest corner, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.24 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.25 West facade, approximately 3:00PM-4:30PM



Image 6.W.25 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.26 Southwest corner, approximately 3:00PM-4:30PM

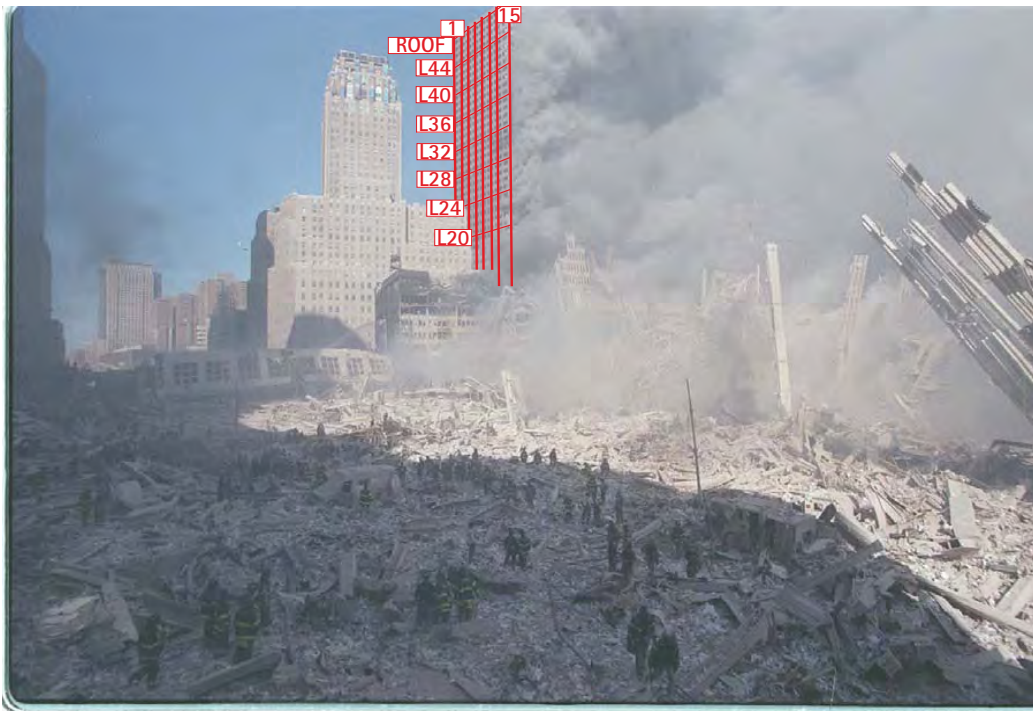


Image 6.W.26 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.27 Southwest corner, approximately 3:00PM-4:30PM

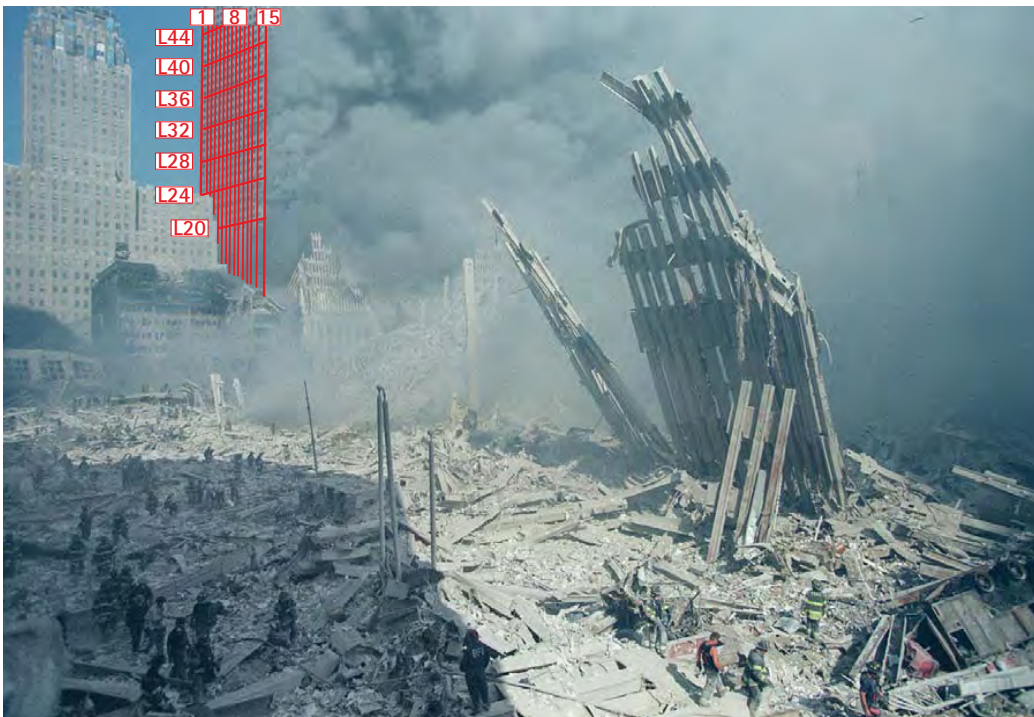


Image 6.W.27 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.28 Southwest corner, approximately 3:00PM-4:30PM

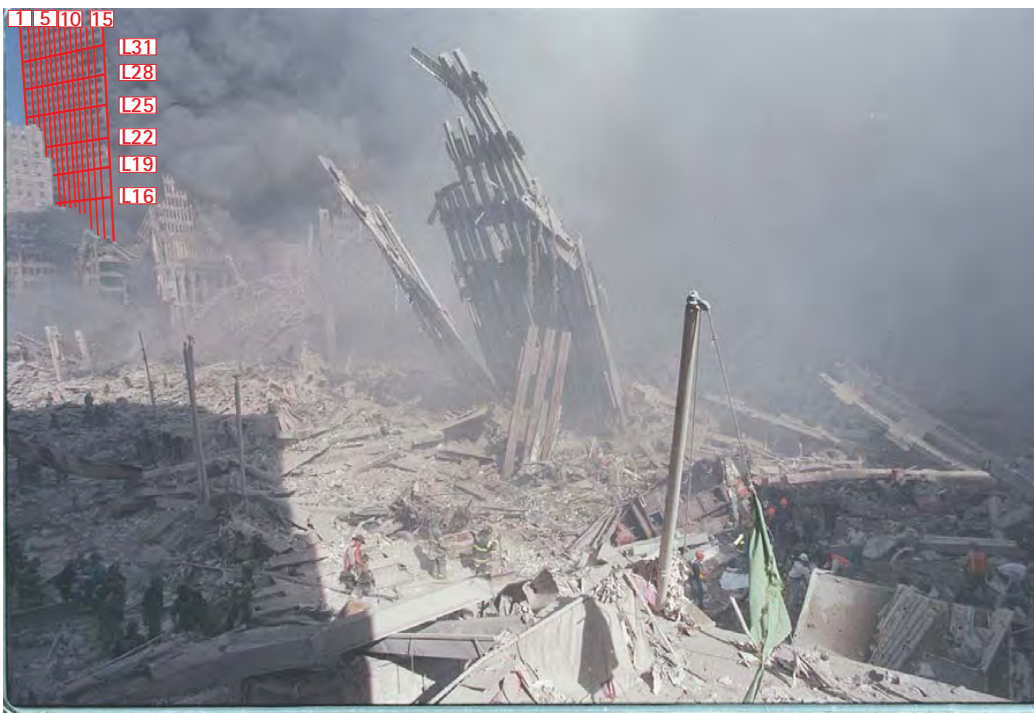


Image 6.W.28 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 6.W.29 Southwest corner, approximately 3:00PM-4:30PM



(Bottom)

Image 6.W.29 with columns and floor levels overlaid

Guy Nordenson and Associates

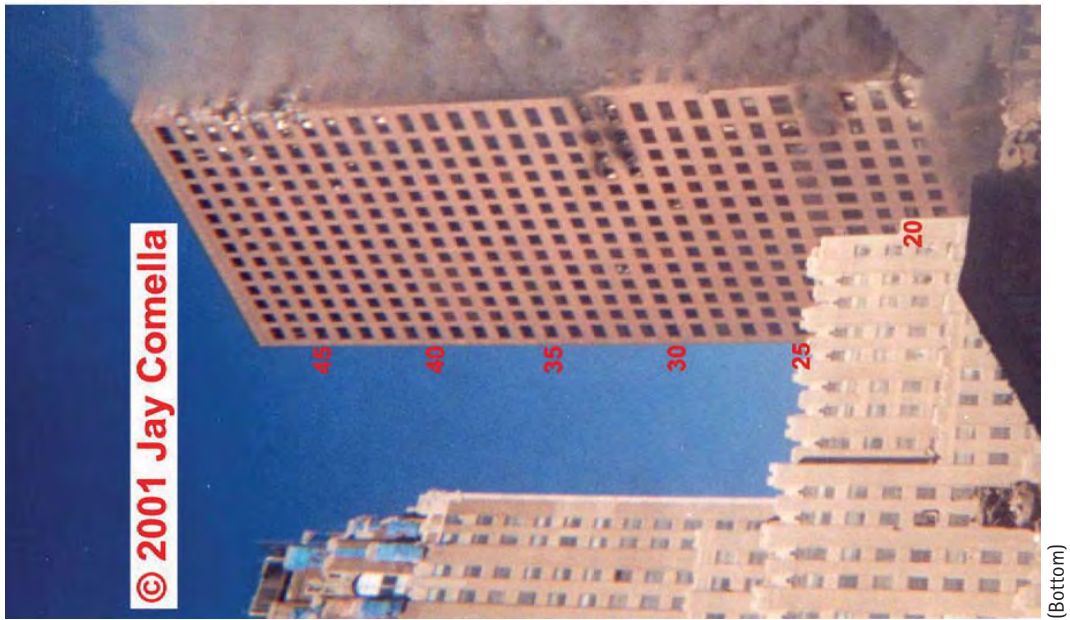


Image 6.W.30 Southwest corner, 3:30PM-4:30PM

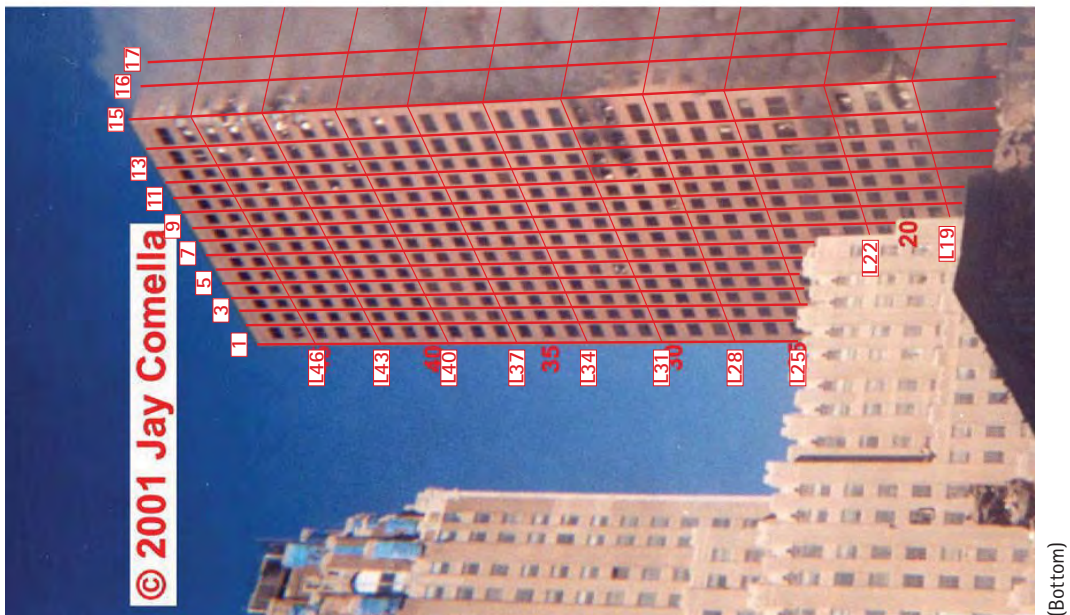


Image 6.W.30 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.31 Southwest corner, approximately 3:30PM-4:30PM



Image 6.W.31 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 6.W.32 North facade, 3:41:30PM +/-300S



Image 6.W.32 with columns and floor levels overlaid

Guy Nordenson and Associates

A.7 FIRE PROGRESSION – 4PM TO 5PM

East Facade – During this time period fires arrived at the east facade on levels 7 and 9, having traveled across the north face, while a fire still burned at the northeast corner on floor 13. The fire on floor 7 occurred at the beginning of the hour while 9 arrived around the middle. Visual evidence also suggests that fires burned at the southern portion of the facade on levels 7 and 8 near the middle of the time period. In addition, an image indicates that smoke may have been emitted on floor 6.

North Facade – The first visual evidence of fire at level 11 on the north facade occurred during the second half of this time period. Level 9 continued to burn for the better portion of the hour. Fires were visible sporadically on levels 7, 8, and 12. There is no visual evidence of fire on level 13 during this time.

West Facade – No new visual evidence of fire-related damage during this time period.

South Facade – No new visual evidence of fire-related damage during this time period.

A.7.1 Fire Damage Diagrams

Figures 7.E.01, 7.N.01, 7.W.01, and 7.S.01 on pages 274 to 278 depict the condition of each elevation at the end of this time period as evidenced in the available images. These diagrams are cumulative and contain the fire-related damage timed up until 5:00pm as well as the debris damage from WTC1's collapse. Fire damage types include smoke, broken window with internal fire, broken window with external fire, and burned-out. The fire-related damage on these figures represents a compilation of the last available visual evidence for each area within hour; therefore, these diagrams are only an approximation of what the elevation might have looked like at 5:00pm.

Figures 7.N.02 and 7.N.03 on pages 275 and 276 depicts a series of sequential images showing the progression of fire in a particular area of the north facade during this time increment. While the full elevation diagrams represent the condition of each facade at the end of the time period, the detail elevation mappings illustrate how fire traveled or altered throughout the hour in a specific area. Debris damage has been omitted from these diagrams for clarity.

Guy Nordenson and Associates

A.7.2 Photographs of Damage

The images found on pages 279 to 293 are all the images that show fire-related damage and are attributed to the time period from 4:00pm until 5:00pm. Each image is presented twice on one page; the top image is the untouched version while columns and level markers have been added to the lower image for reference. In some instances an untouched version of the photograph was not available and in its place an image that NIST has notated is used instead. These images are also shown twice with additional column and level markers added for full clarity.

Guy Nordenson and Associates

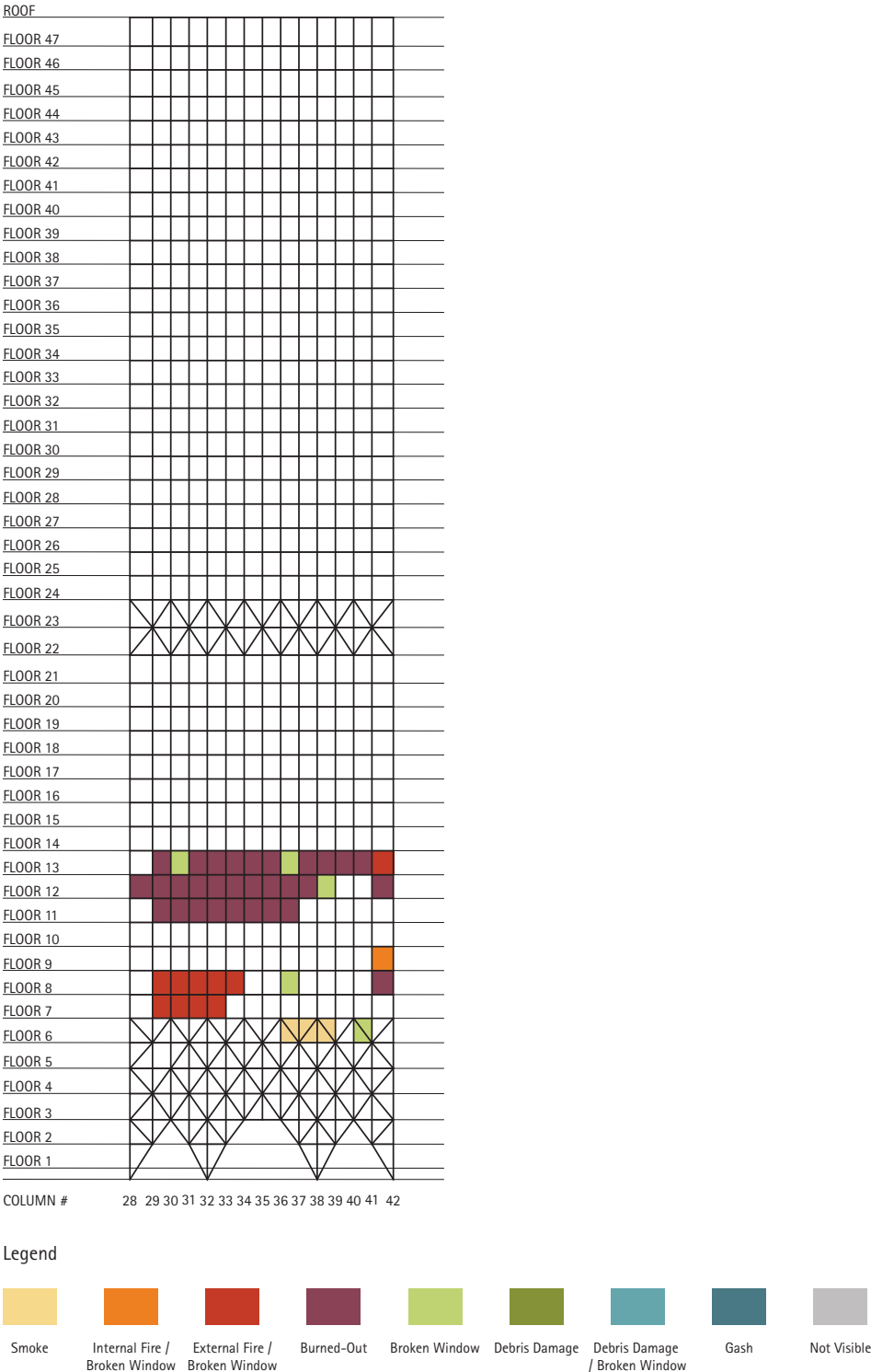


Figure 7.E.01 WTC7 East facade - Debris and Fire Damage at approximately 5PM

Guy Nordenson and Associates

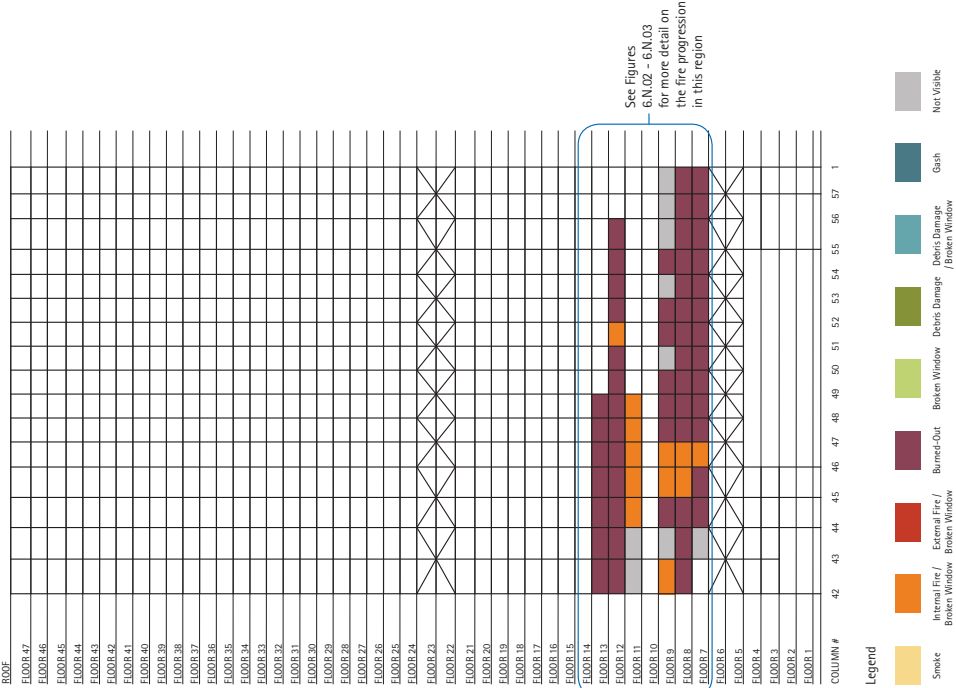


Figure 7.N.01 WTC7 North Facade - Debris and Fire Damage at approximately 5PM

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16 December 2009

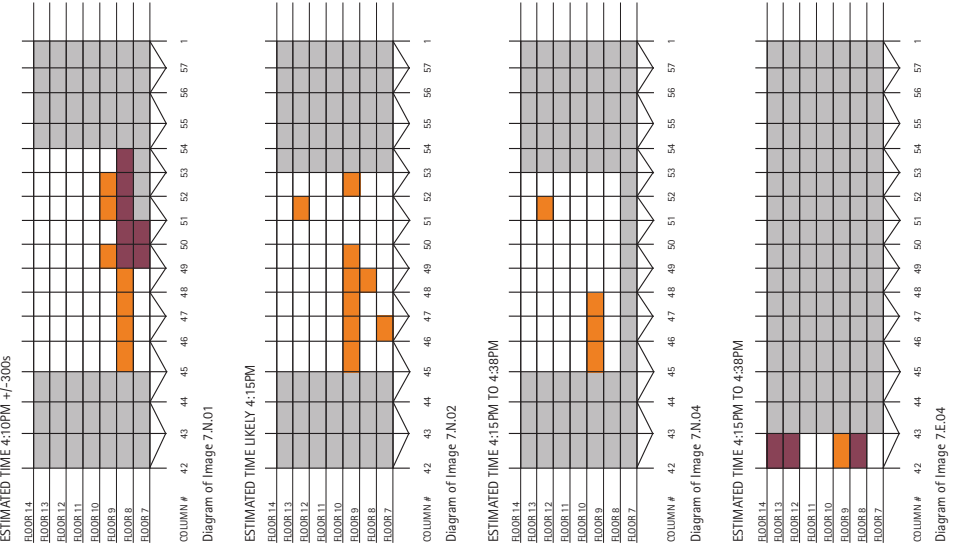


Figure 7.N.02 WTC7 North Facade - Detailed Fire Progression from 4PM to 5PM



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ESTIMATED TIME 4:38:11PM +/-1s

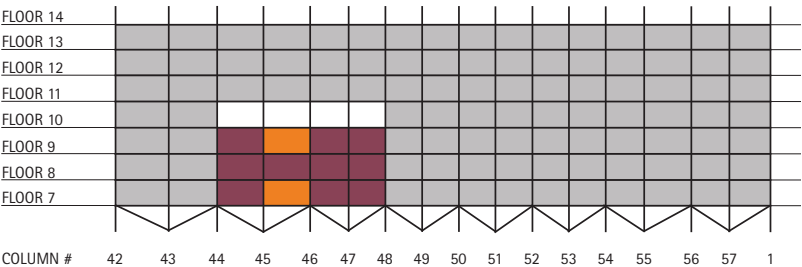


Diagram of Image 7.N.05



Image 7.N.05

ESTIMATED TIME 4:10PM +/-300s

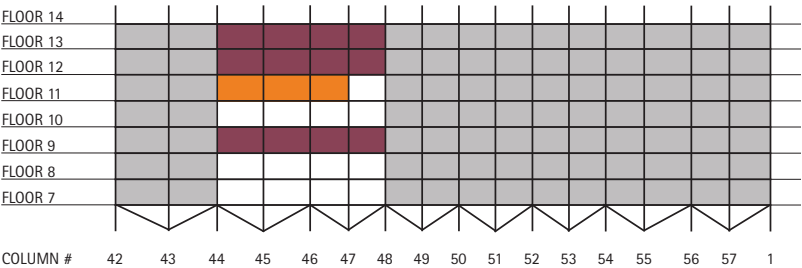


Diagram of Image 7.N.01



Image 7.N.01

ESTIMATED TIME LIKELY 4:15PM

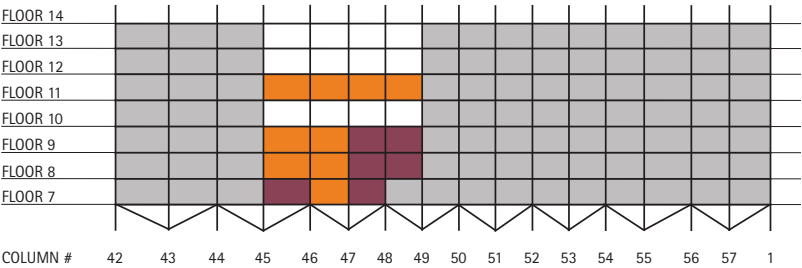


Diagram of Image 7.N.02



Image 7.N.02

Legend



Figure 7.N.03 WTC7 North Facade - Detailed Fire Progression from 4PM to 5PM

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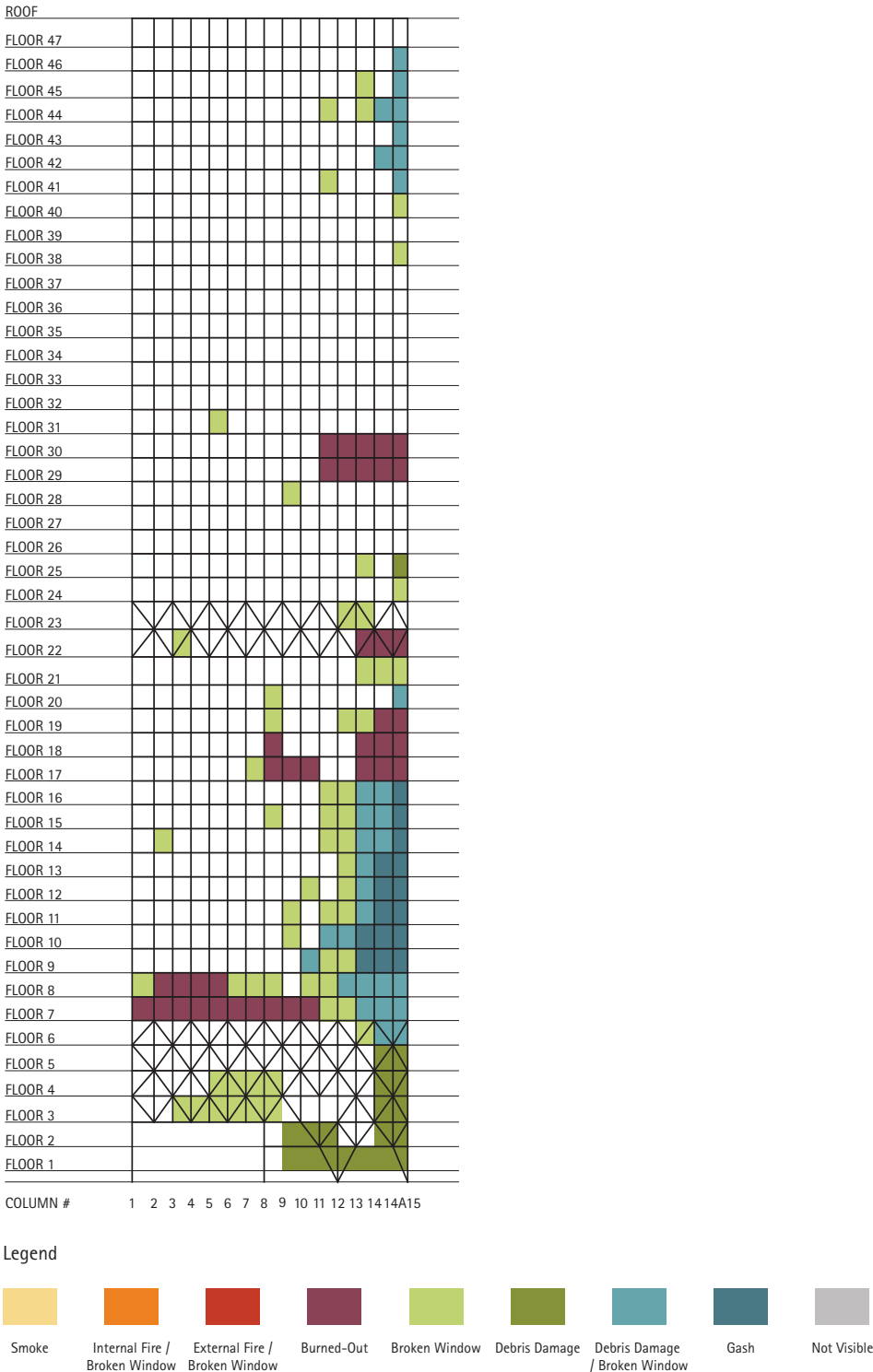


Figure 7.W.01 WTC7 West facade - Debris and Fire Damage at approximately 5PM

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Image 7.E.01 Northeast corner, after 4:00PM



Image 7.E.01 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.E.02 Northeast corner, after 4:00PM



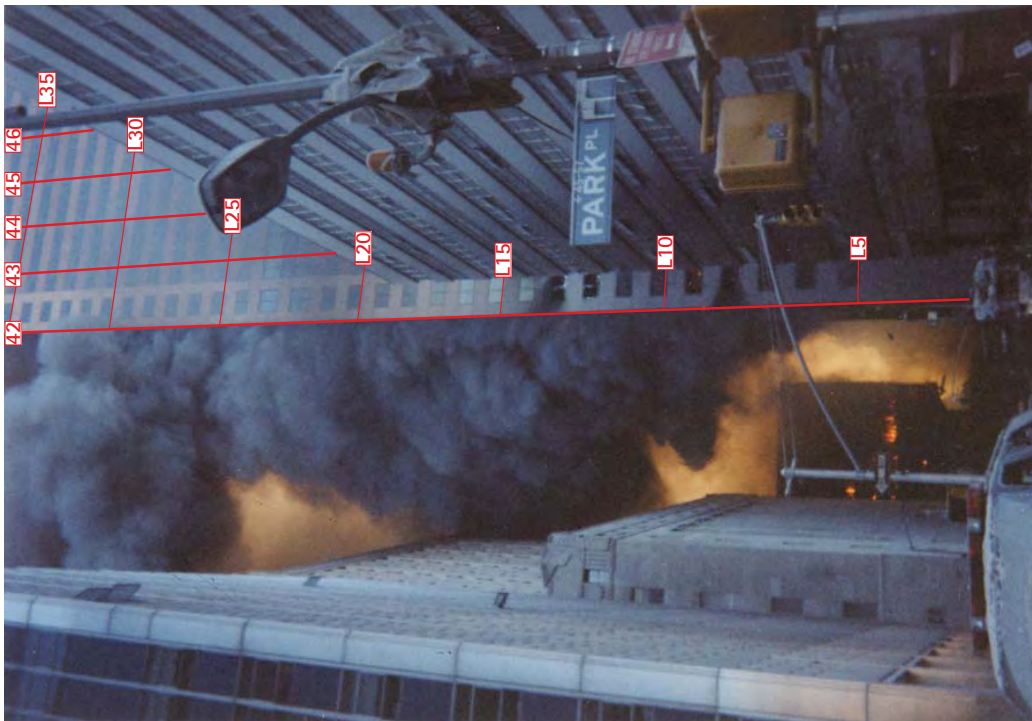
Image 7.E.02 with columns and floor levels overlaid

Guy Nordenson and Associates



(Bottom)

Image 7.E.03 Northeast corner, approximately 4:15PM-4:38PM



(Bottom)

Image 7.E.03 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.E.04 Northeast corner, approximately 4:15PM-4:38PM

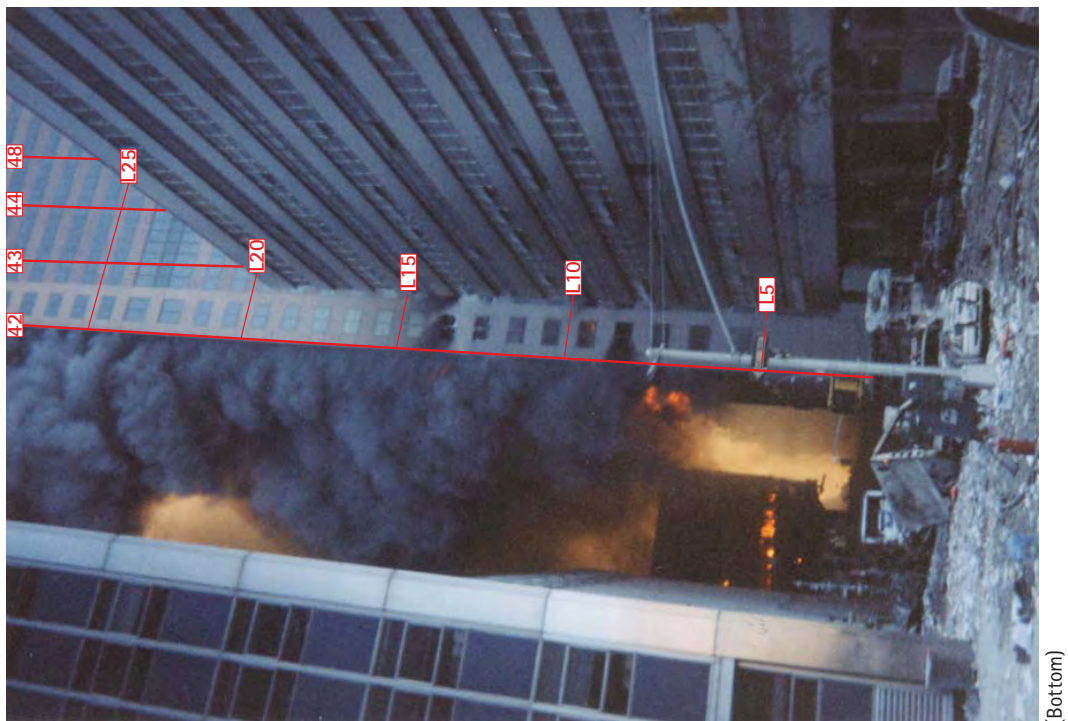


Image 7.E.04 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.N.01 North facade, 4:10PM +/-300S



Image 7.N.01 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.N.02 North facade, likely 4:15PM

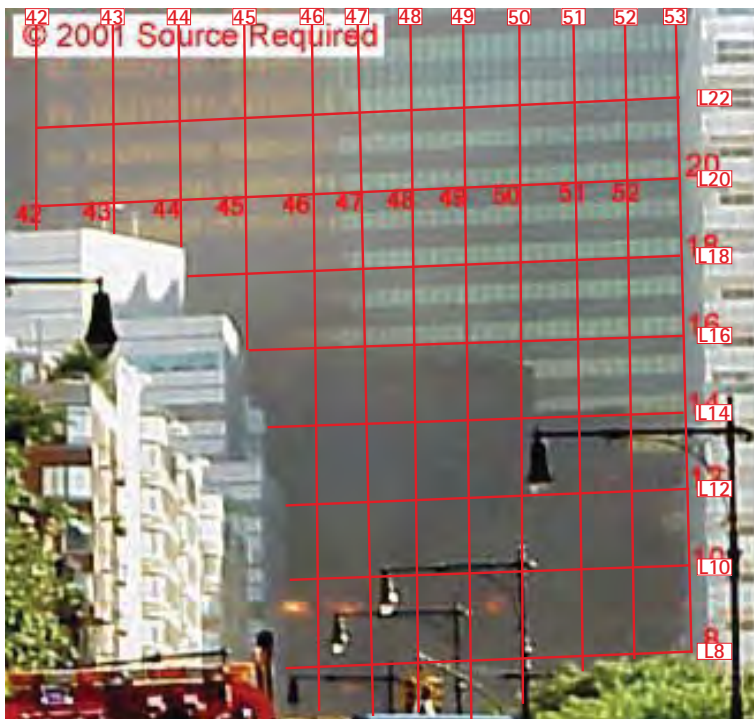


Image 7.N.02 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.N.03 North facade, approximately 4:15PM-4:38PM

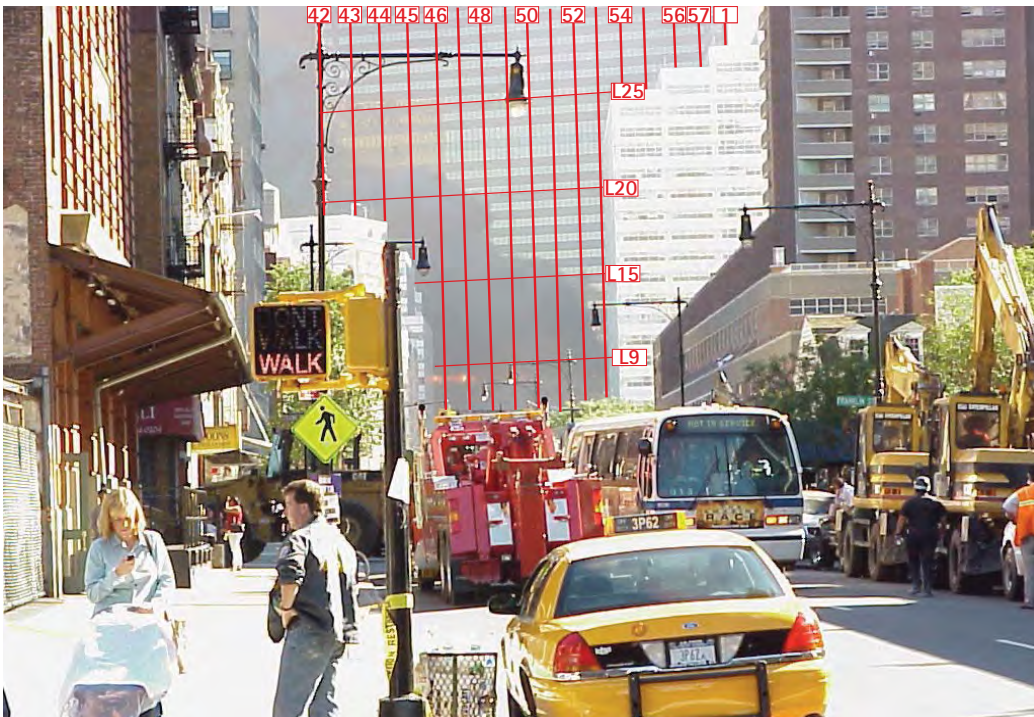


Image 7.N.03 with columns and floor levels overlaid

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Image 7.N.04 North facade, approximately 4:15PM-4:38PM

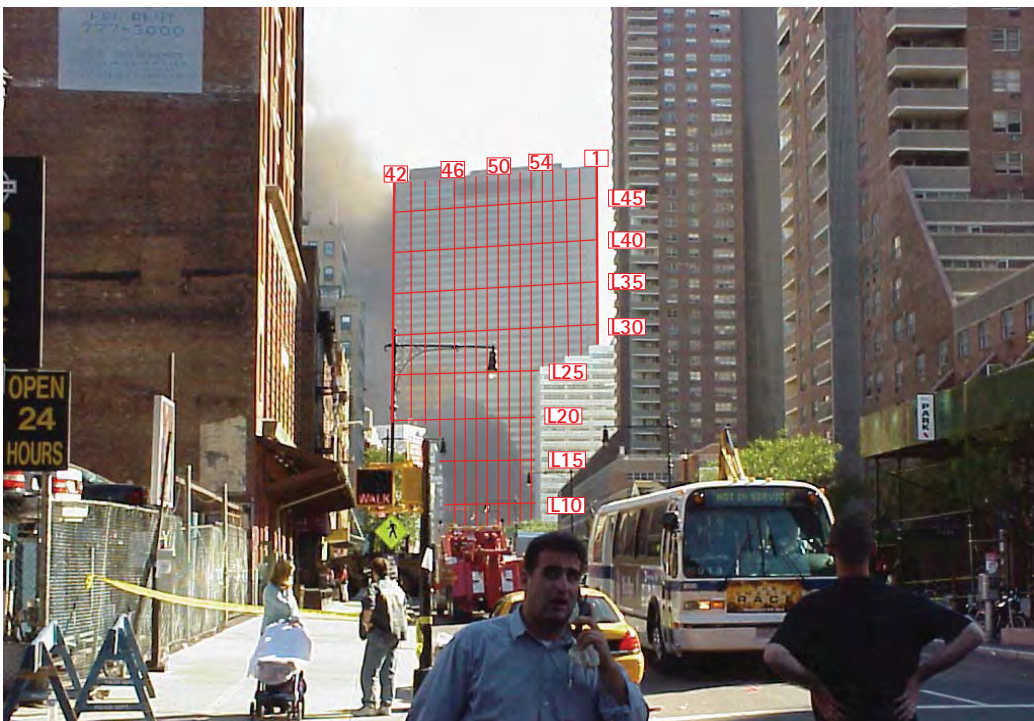


Image 7.N.04 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.N.05 North facade, 4:38:11PM +/-1S



Image 7.N.05 with columns and floor levels overlaid

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Image 7.N.06 North facade, 4:38:14PM +/-1S



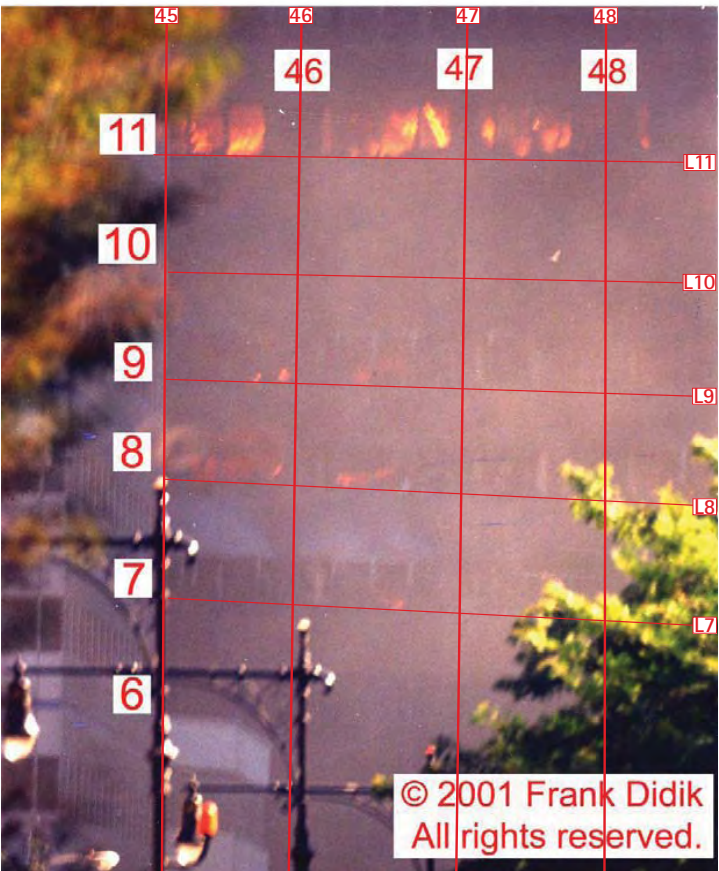
Image 7.N.06 with columns and floor levels overlaid

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(Bottom)

Image 7.N.07 North facade, likely 4:39PM +/-120S



(Bottom)

Image 7.N.07 with columns and floor levels overlaid

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(Bottom)

Image 7.W.01 West facade, approximately after 4:00PM



(Bottom)

Image 7.W.01 with columns and floor levels overlaid

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Image 7.W.02 West facade, approximately after 4:00PM

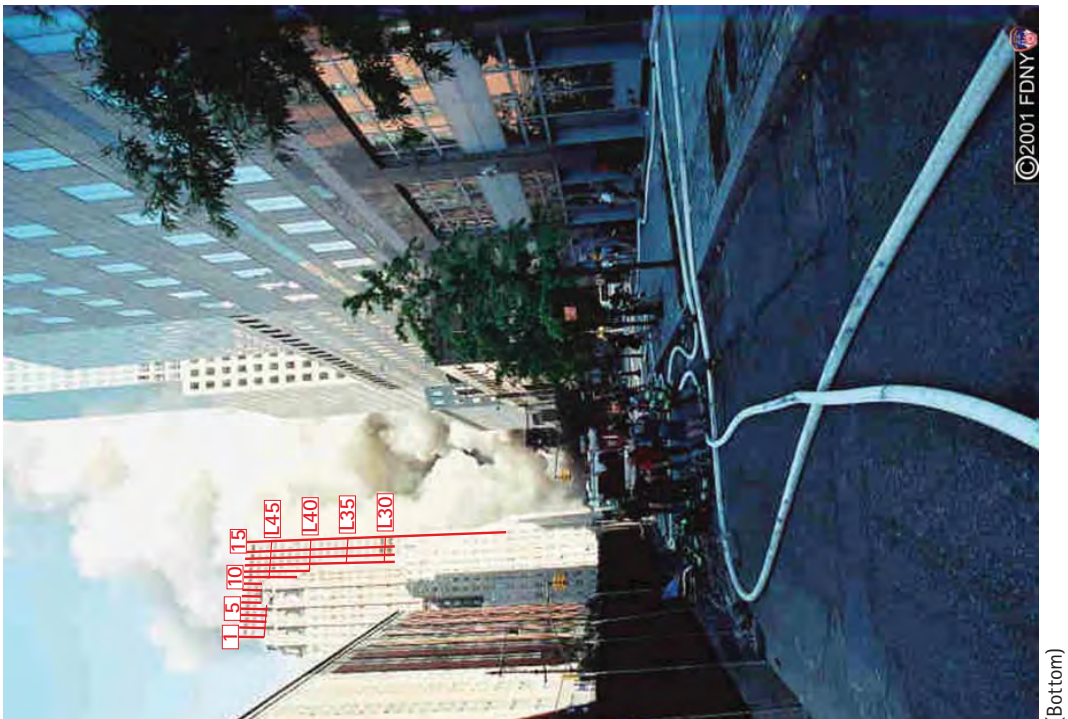


Image 7.W.02 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.W.03 West facade, approximately after 4:00PM



Image 7.W.03 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 7.S.01 Southwest corner, mid-late afternoon

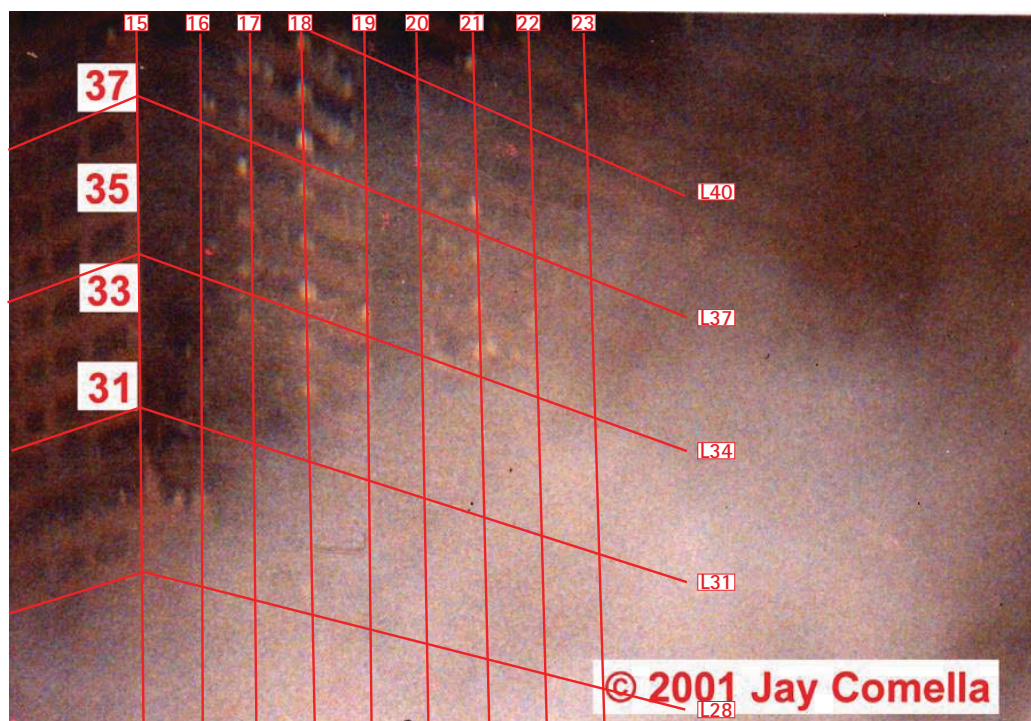


Image 7.S.01 with columns and floor levels overlaid

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A.8 FIRE PROGRESSION – 5PM TO WTC7 COLLAPSE

East Facade – No new visual evidence of fire-related damage during this time period.

North Facade – During this time period fires were visible only on levels 11, 12, and 13. The fires on floors 7, 8, and 9 had moved east or had dissipated altogether. Photographs show that the fires on 12 and 13 had progressed far west while 11's fire remained in the central portion of the facade. The last image before collapse reveals very large flames projecting from level 13.

West Facade – No new visual evidence of fire-related damage during this time period.

South Facade – No new visual evidence of fire-related damage during this time period.

A.8.1 Fire Damage Diagrams

Figures 8.E.01, 8.N.01, 8.W.01, and 8.S.01 on pages 296 to 299 depict the condition of each elevation at the end of this time period as evidenced in the available images. These diagrams are cumulative and contain the fire-related damage timed up until collapse as well as the debris damage from WTC1's collapse. Fire damage types include smoke, broken window with internal fire, broken window with external fire, and burned-out. The fire-related damage on these figures represents a compilation of the last available visual evidence for each area within hour; therefore, these diagrams are only an approximation of what the elevation might have looked like right before the building's collapse.

Figure 8.N.02 on page 297 depicts a series of sequential images showing the progression of fire in a particular area of the north facade during this time increment. While the full elevation diagrams represent the condition of each facade at the end of the time period, the detail elevation mappings illustrate how fire traveled or altered throughout the hour in a specific area. Debris damage has been omitted from these diagrams for clarity.

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A.8.2 Photographs of Damage

The images found on pages 300 to 306 are all the images that show fire-related damage and are attributed to the time period from 5:00pm until building collapse. Each image is presented twice on one page; the top image is the untouched version while columns and level markers have been added to the lower image for reference. In some instances an untouched version of the photograph was not available and in its place an image that NIST has notated is used instead. These images are also shown twice with additional column and level markers added for full clarity.

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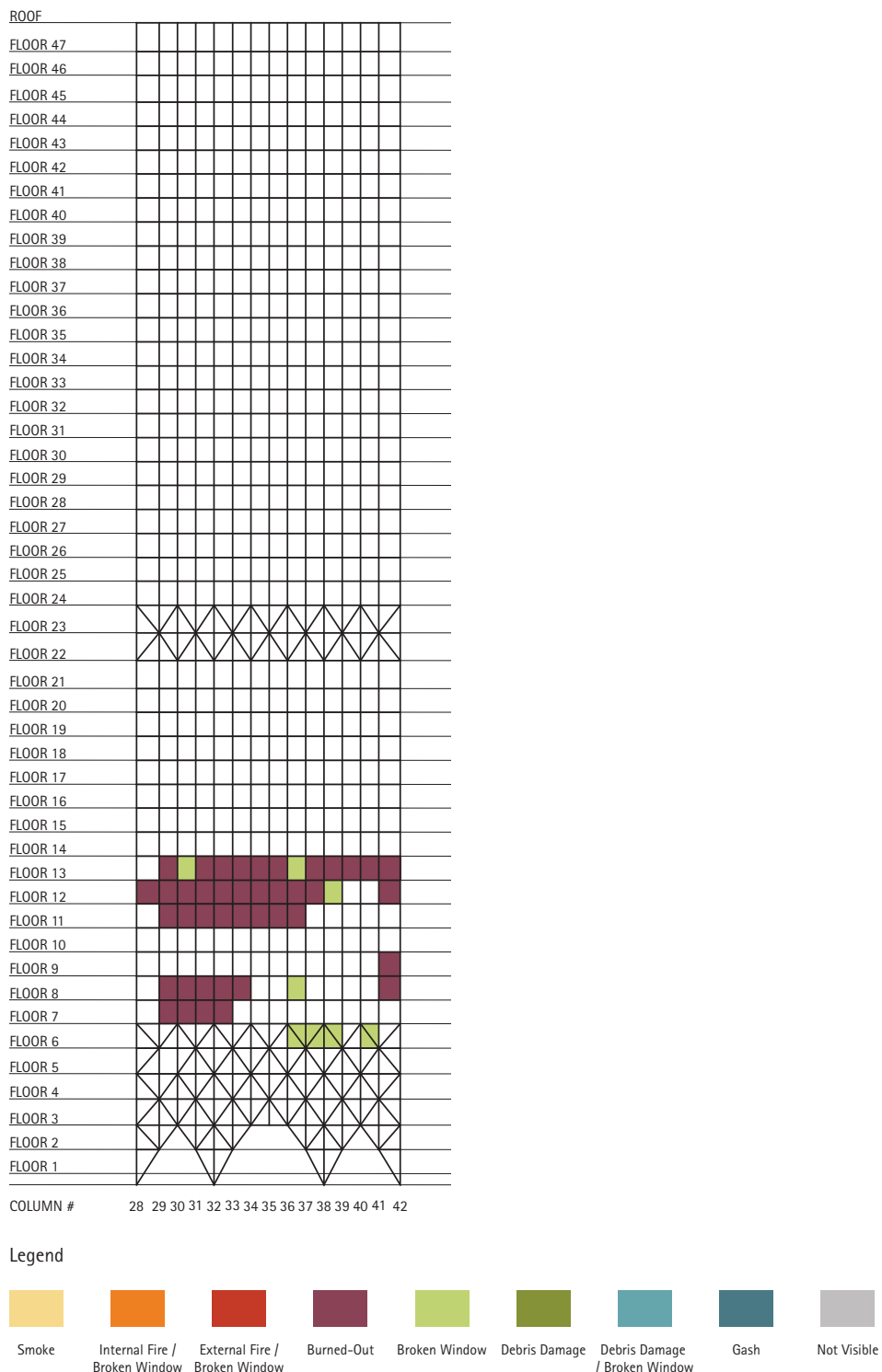


Figure 8.E.01 WTC7 East facade - Debris and Fire Damage at the approximate time of WTC7 collapse

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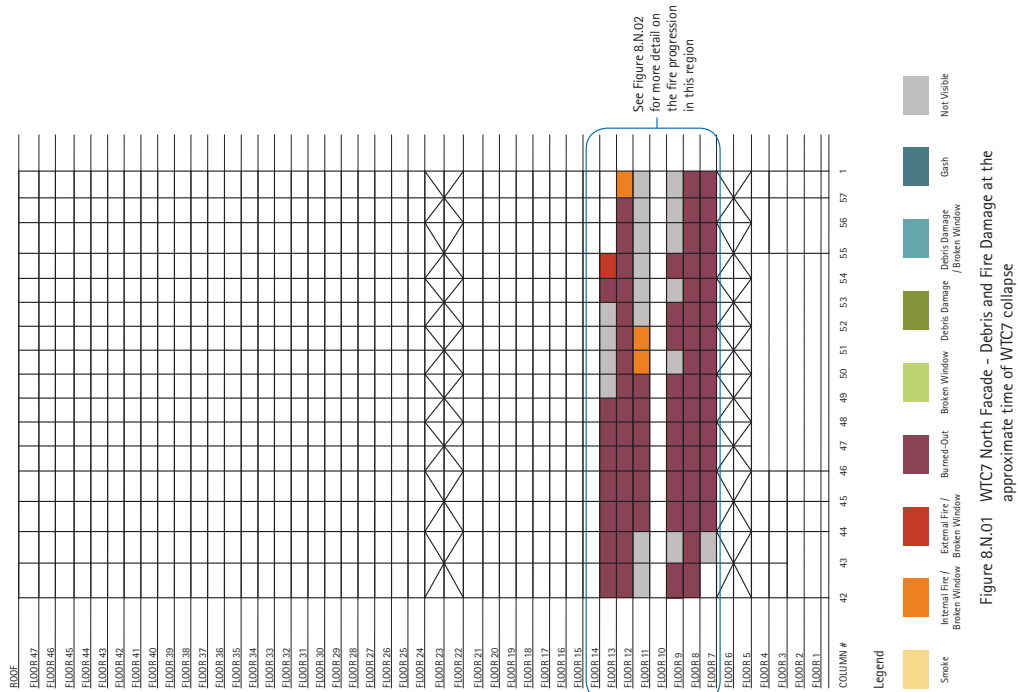


Figure 8.N.02 WTC7 North Facade - Detailed Fire Progression from 5PM to collapse



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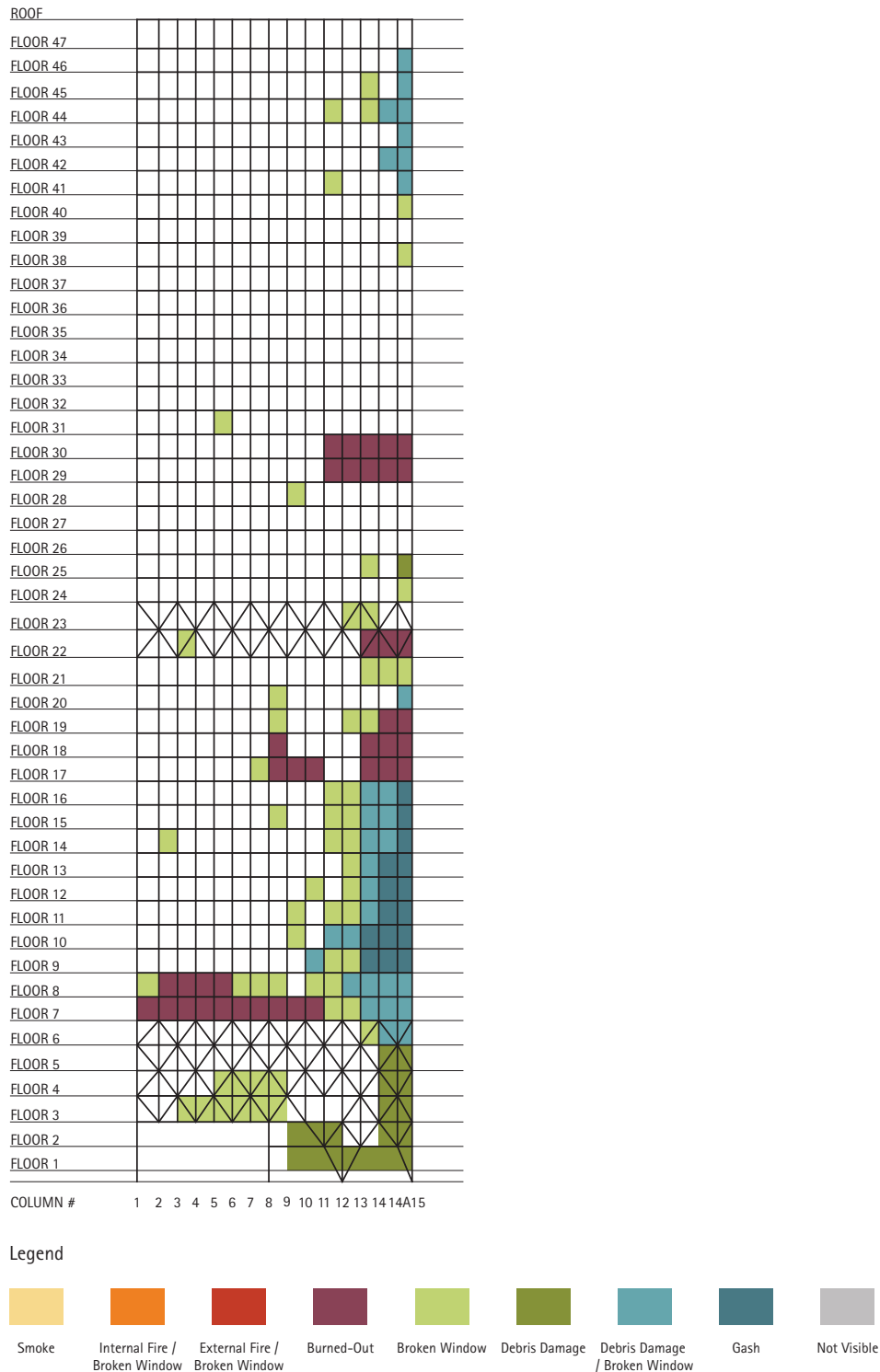


Figure 8.W.01 WTC7 West facade - Debris and Fire Damage at the approximate time of WTC7 collapse

Guy Nordenson and Associates

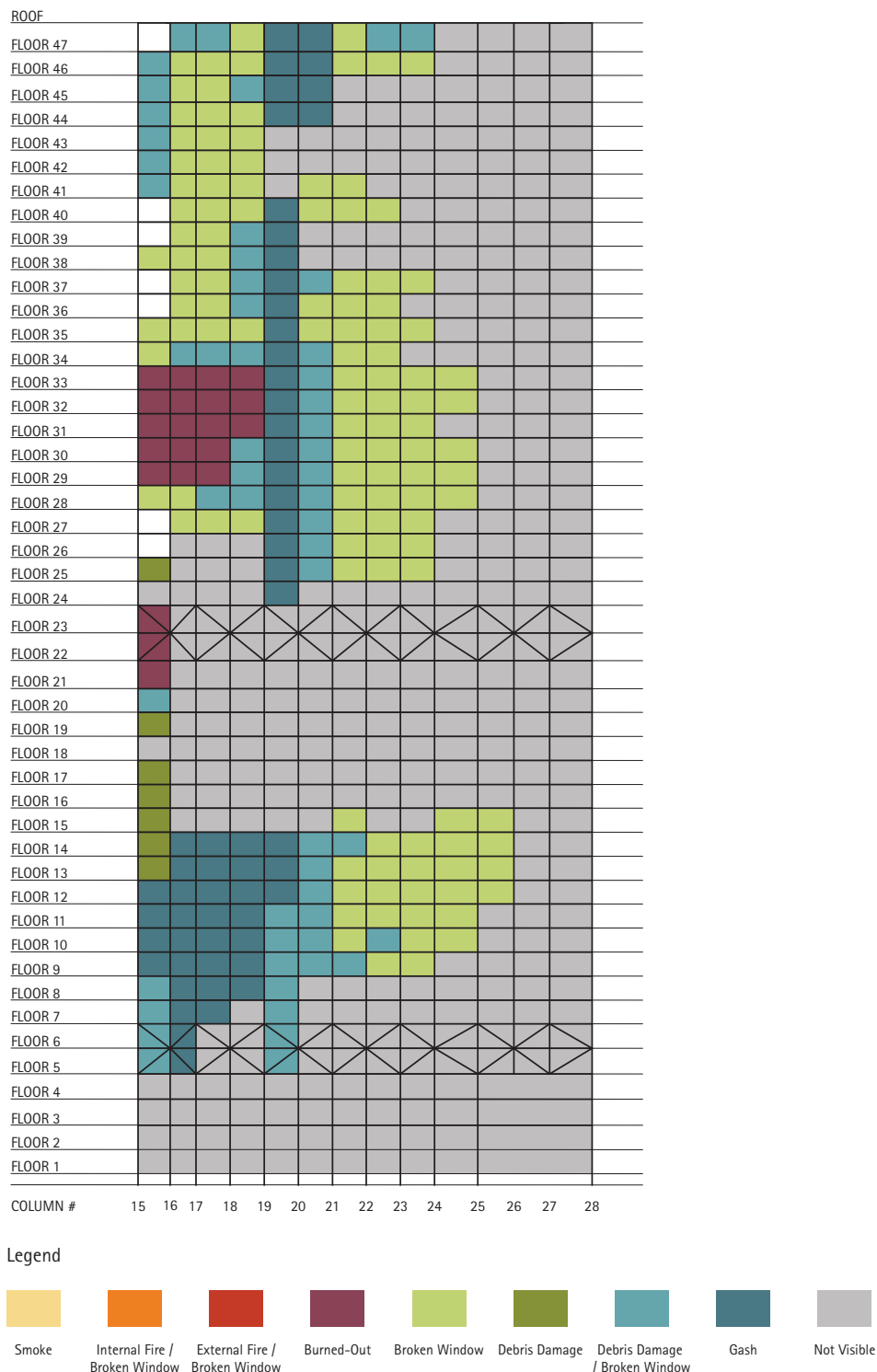


Figure 8.S.01 WTC7 South facade - Debris and Fire Damage at the approximate time of WTC7 collapse

Guy Nordenson and Associates

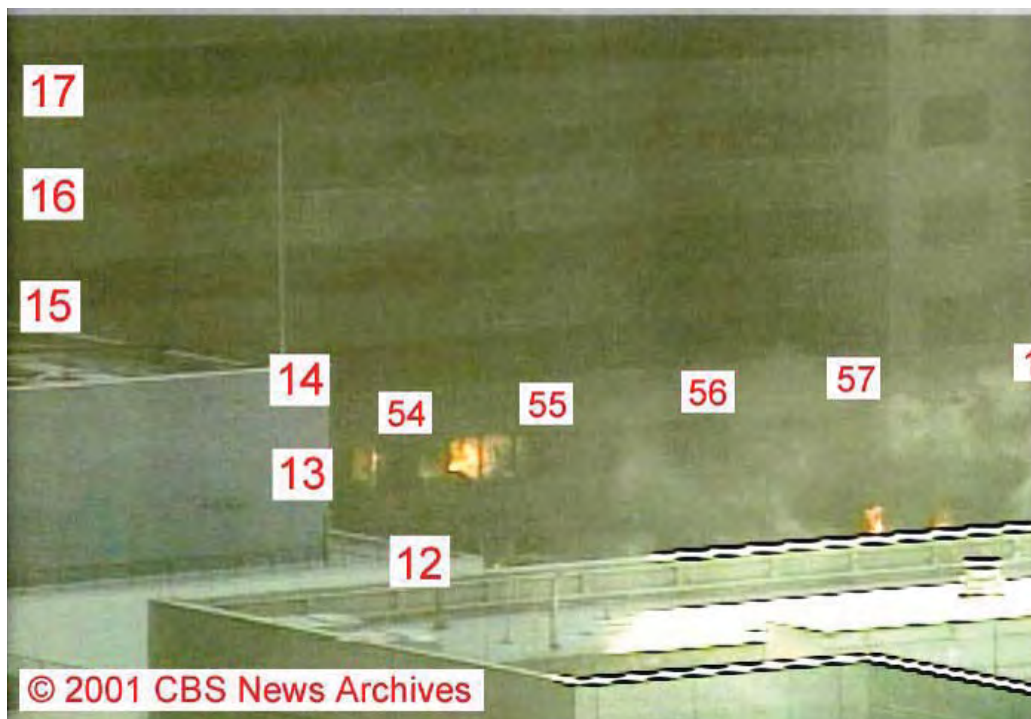


Image 8.N.01 North facade, around 5:00PM +/-600S

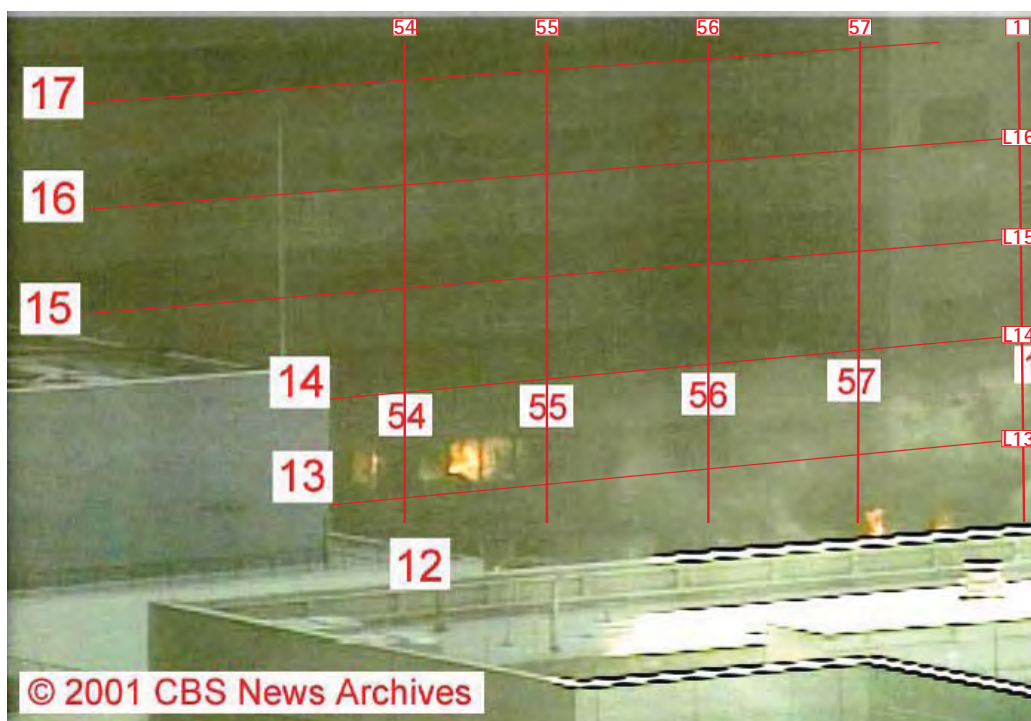


Image 8.N.01 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 8.N.02 North facade, approximately 5:00PM-5:09PM

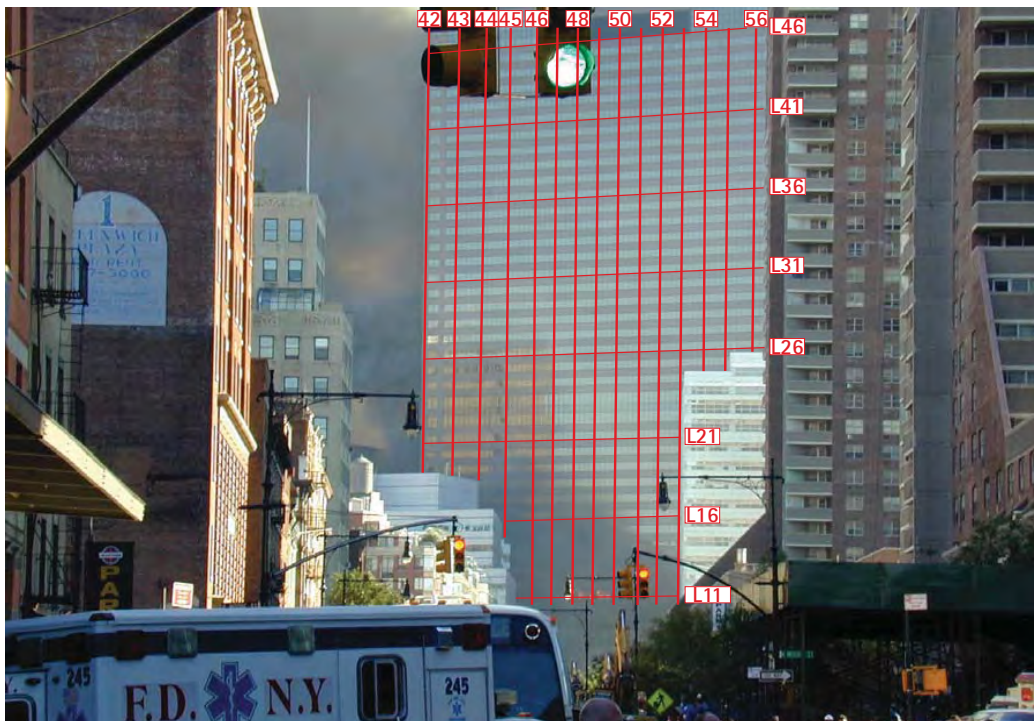


Image 8.N.02 with columns and floor levels overlaid

Guy Nordenson and Associates

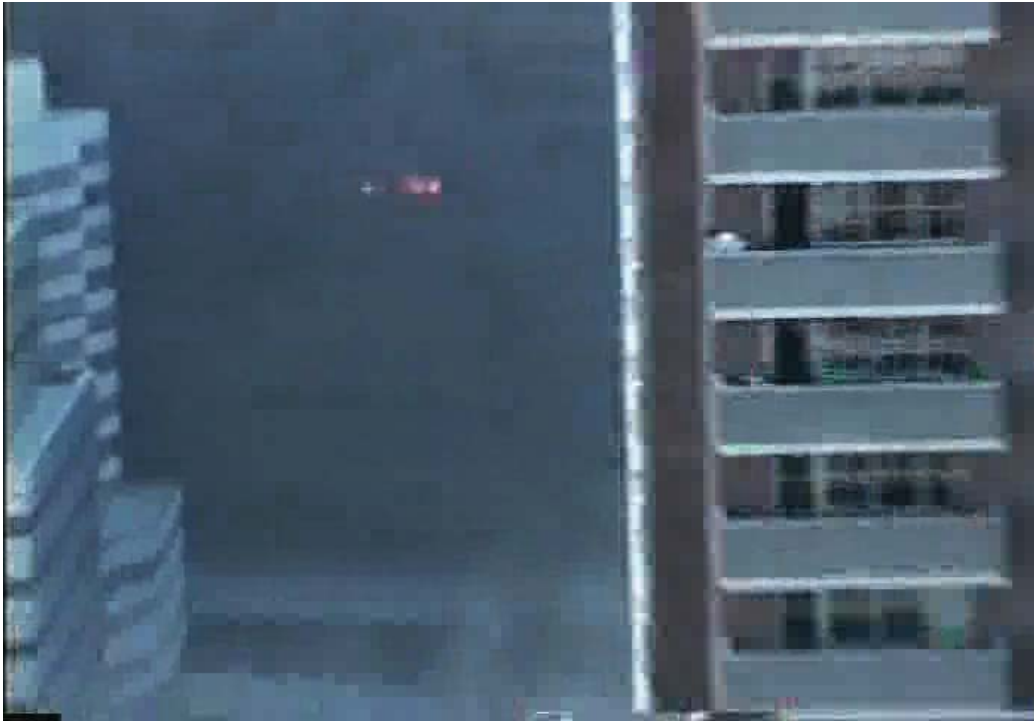


Image 8.N.03 North facade, 5:09:03PM +/-120S



Image 8.N.03 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 8.N.04 North facade, approximately 5:09PM-5:19PM

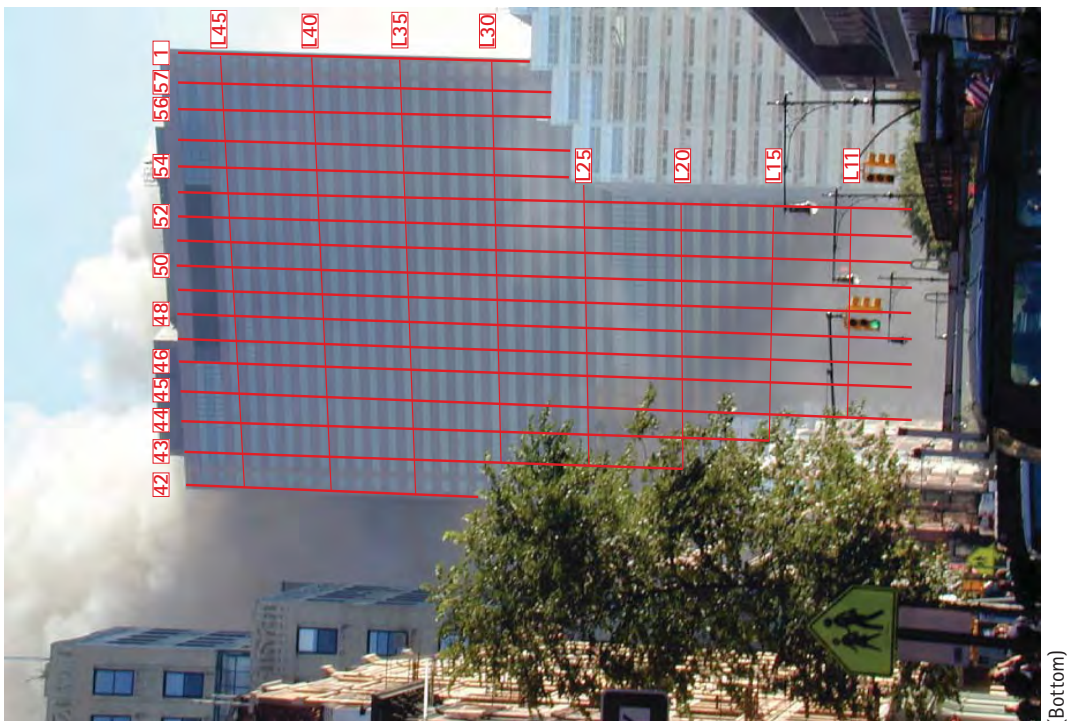


Image 8.N.04 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 8.N.05 North facade, 5:19:45PM +/-120S

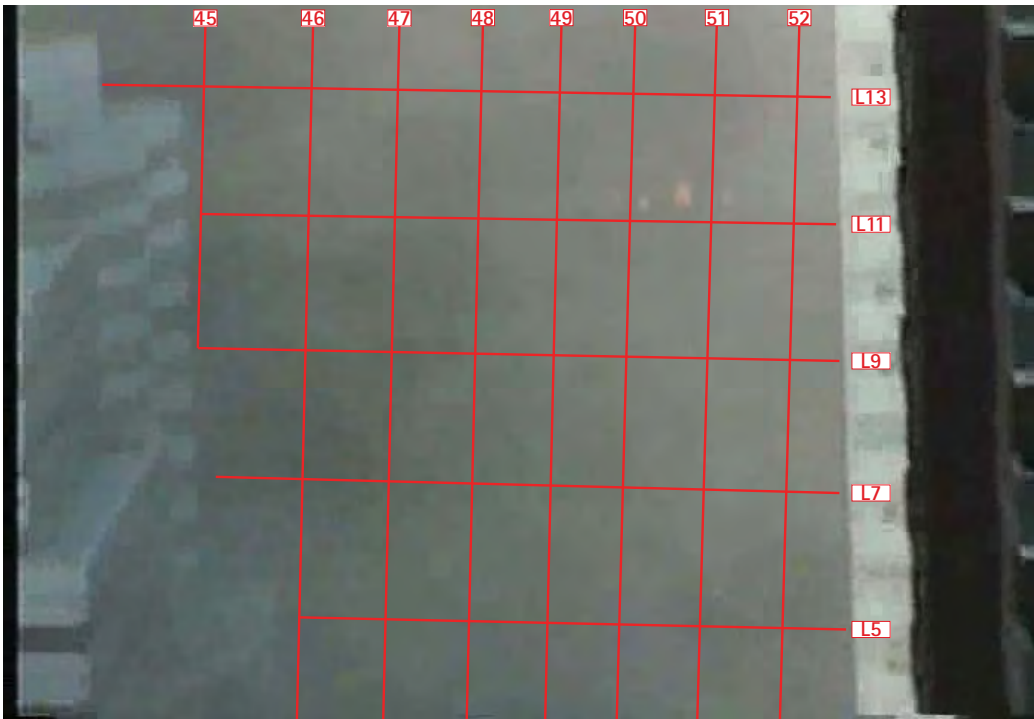


Image 8.N.05 with columns and floor levels overlaid

Guy Nordenson and Associates



Image 8.N.06 North facade, 5:20:17PM +/-15S

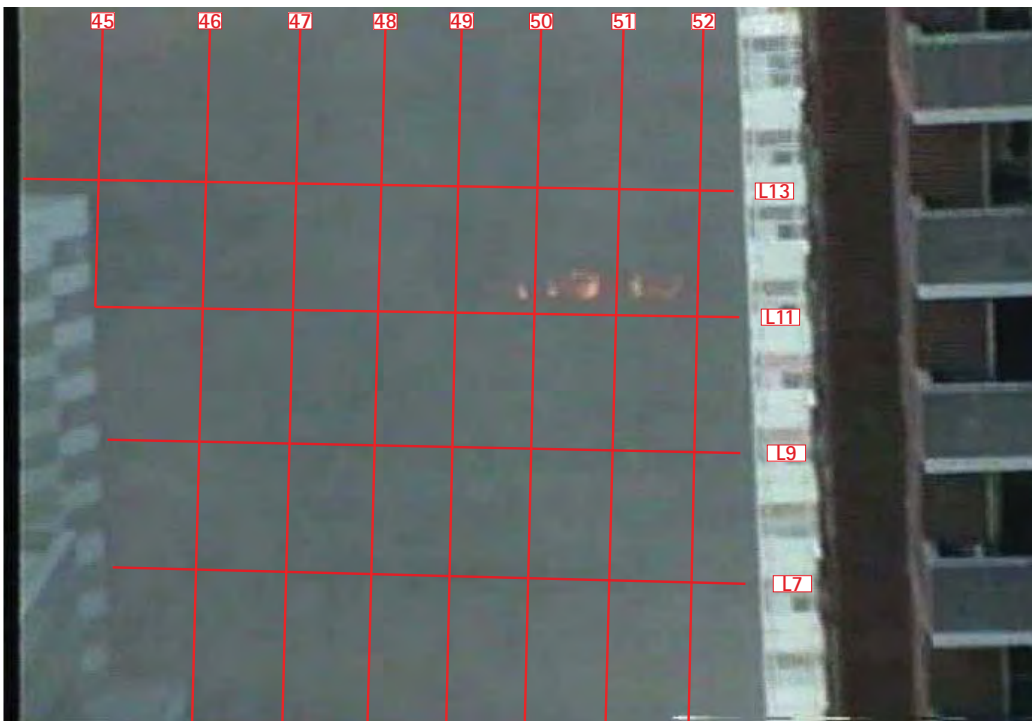


Image 8.N.06 with columns and floor levels overlaid

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Image 8.N.07 North facade, likely few minutes before collapse

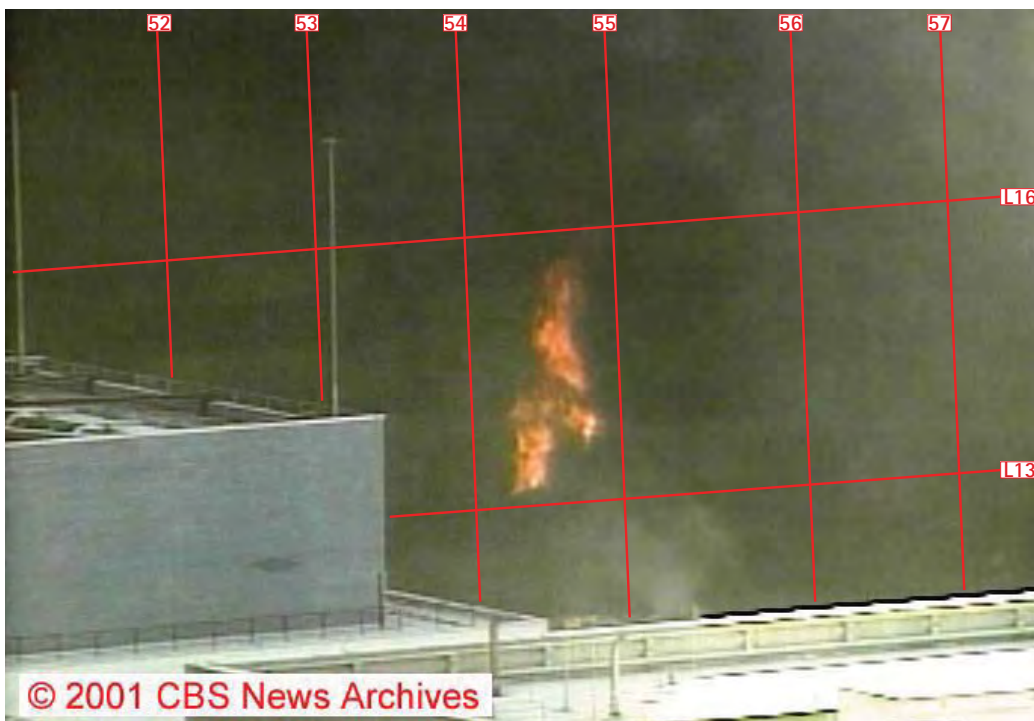


Image 8.N.07 with columns and floor levels overlaid

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APPENDIX 1A

Photographic Damage Index

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.E.01	East	Broken Window	8	36-37		
1.E.02	East	Broken Window	8	36-37		
1.N.01	North	Broken Window	8	42-43		
1.N.02	North	Broken Window	8	42-43		
1.N.03	North	Broken Window	8	42-43		
1.W.01	West	Debris Damage / Broken Window	46	14A-15	FILE	10:40:50AM
1.W.01	West	Broken Window	45	13-14	FILE	10:40:50AM
1.W.01	West	Debris Damage / Broken Window	45	14A-15	FILE	10:40:50AM
1.W.01	West	Broken Window	44	11-12, 13-14	FILE	10:40:50AM
1.W.01	West	Debris Damage / Broken Window	44	14-15	FILE	10:40:50AM
1.W.01	West	Debris Damage	43	14A-15	FILE	10:40:50AM
1.W.01	West	Debris Damage / Broken Window	42	14-15	FILE	10:40:50AM
1.W.01	West	Broken Window	41	11-12	FILE	10:40:50AM
1.W.01	West	Debris Damage / Broken Window	41	14A-15	FILE	10:40:50AM
1.W.01	West	Broken Window	38	14A-15	FILE	10:40:50AM
1.W.01	West	Broken Window	31	5-6	FILE	10:40:50AM
1.W.01	West	Broken Window	22	3-4	FILE	10:40:50AM
1.W.02	West	Debris Damage	46	14A-15	FILE	11:33:43AM
1.W.02	West	Broken Window	45	13-14	FILE	11:33:43AM
1.W.02	West	Debris Damage	45	14A-15	FILE	11:33:43AM
1.W.02	West	Debris Damage	43	14A-15	FILE	11:33:43AM
1.W.02	West	Debris Damage / Broken Window	42	14A-15	FILE	11:33:43AM
1.W.02	West	Debris Damage / Broken Window	41	14A-15	FILE	11:33:43AM
1.W.03	West	Debris Damage / Broken Window	46	14A-15	FILE	11:41:14AM
1.W.03	West	Broken Window	45	13-14	FILE	11:41:14AM
1.W.03	West	Debris Damage / Broken Window	45	14A-15	FILE	11:41:14AM
1.W.03	West	Debris Damage / Broken Window	44	14-15	FILE	11:41:14AM
1.W.03	West	Debris Damage	43	14A-15	FILE	11:41:14AM
1.W.03	West	Debris Damage / Broken Window	42	14-15	FILE	11:41:14AM
1.W.03	West	Debris Damage / Broken Window	41	14A-15	FILE	11:41:14AM
1.W.03	West	Broken Window	40	14A-15	FILE	11:41:14AM
1.W.03	West	Broken Window	38	14A-15	FILE	11:41:14AM
1.W.04	West	Broken Window	45	13-14, 14A-15	FILE	11:47:46AM
1.W.04	West	Broken Window	44	11-12	FILE	11:47:46AM
1.W.04	West	Debris Damage / Broken Window	44	14A-15	FILE	11:47:46AM
1.W.04	West	Debris Damage	43	14A-15	FILE	11:47:46AM
1.W.04	West	Debris Damage / Broken Window	42	14A-15	FILE	11:47:46AM
1.W.04	West	Debris Damage	41	14A-15	FILE	11:47:46AM
1.W.05	West	Broken Window	18	13-14	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	18	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	17	13-14	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	17	14-15	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	16	13-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	15	13-14	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	15	14-14A	NIST	shadows suggest before noon

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.W.05	West	Gash	15	14A-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	14	11-14	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	14	14-14A	NIST	shadows suggest before noon
1.W.05	West	Gash	14	14A-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	13	12-13	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	13	13-14	NIST	shadows suggest before noon
1.W.05	West	Gash	13	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	12	10-11	NIST	shadows suggest before noon
1.W.05	West	Broken Window	12	12-14	NIST	shadows suggest before noon
1.W.05	West	Gash	12	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	11	9-10, 11-14	NIST	shadows suggest before noon
1.W.05	West	Gash	11	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	10	9-10, 11-13	NIST	shadows suggest before noon
1.W.05	West	Gash	10	13-15	NIST	shadows suggest before noon
1.W.05	West	Debris Damage	9	6-7	NIST	shadows suggest before noon
1.W.05	West	Broken Window	9	10-13	NIST	shadows suggest before noon
1.W.05	West	Gash	9	13-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	8	6-7, 8-9, 10-12	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	8	12-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	7	9-14	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	7	14-15	NIST	shadows suggest before noon
1.W.05	West	Debris Damage / Broken Window	6	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	4	5-9	NIST	shadows suggest before noon
1.W.05	West	Debris Damage	4	14-15	NIST	shadows suggest before noon
1.W.05	West	Broken Window	3	3-9	NIST	shadows suggest before noon
1.W.05	West	Debris Damage	3	14-15	NIST	shadows suggest before noon
1.W.05	West	Debris Damage	2	9-12, 14-15	NIST	shadows suggest before noon
1.W.05	West	Debris Damage	1	9-15	NIST	shadows suggest before noon
1.W.06	West	Debris Damage / Broken Window	46	14A-15		
1.W.06	West	Debris Damage / Broken Window	45	14A-15		
1.W.06	West	Debris Damage / Broken Window	44	14-15		
1.W.06	West	Debris Damage / Broken Window	43	14A-15		
1.W.06	West	Debris Damage / Broken Window	42	14-15		
1.W.06	West	Debris Damage / Broken Window	41	14A-15		
1.W.06	West	Broken Window	40	14A-15		
1.W.06	West	Broken Window	38	14A-15		
1.W.07	West	Debris Damage / Broken Window	46	14A-15		
1.W.07	West	Debris Damage / Broken Window	45	14A-15		
1.W.07	West	Debris Damage / Broken Window	44	14-15		
1.W.07	West	Debris Damage / Broken Window	43	14A-15		
1.W.07	West	Debris Damage / Broken Window	42	14-15		
1.W.07	West	Debris Damage / Broken Window	41	14A-15		
1.W.07	West	Broken Window	40	14A-15		
1.W.07	West	Broken Window	38	14A-15		
1.W.08	West	Debris Damage / Broken Window	46	14A-15		
1.W.08	West	Debris Damage / Broken Window	45	14A-15		
1.W.08	West	Debris Damage / Broken Window	44	14-15		
1.W.08	West	Debris Damage / Broken Window	43	14A-15		
1.W.08	West	Debris Damage / Broken Window	42	14-15		
1.W.08	West	Debris Damage / Broken Window	41	14A-15		
1.W.08	West	Broken Window	40	14A-15		

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.W.08	West	Broken Window	38	14A-15		
1.W.09	West	Debris Damage / Broken Window	46	14A-15		
1.W.09	West	Broken Window	45	13-14		
1.W.09	West	Debris Damage / Broken Window	45	14A-15		
1.W.09	West	Broken Window	44	11-12, 13-14		
1.W.09	West	Debris Damage / Broken Window	44	14A-15		
1.W.09	West	Debris Damage / Broken Window	43	14A-15		
1.W.09	West	Debris Damage / Broken Window	42	14-15		
1.W.09	West	Broken Window	41	11-12		
1.W.09	West	Debris Damage / Broken Window	41	14A-15		
1.W.09	West	Broken Window	40	14A-15		
1.W.09	South	Debris Damage / Broken Window	46	15-16		
1.W.09	South	Debris Damage / Broken Window	45	15-16		
1.W.09	South	Debris Damage / Broken Window	44	15-16		
1.W.09	South	Debris Damage / Broken Window	43	15-16		
1.W.09	South	Debris Damage / Broken Window	42	15-16		
1.W.09	South	Debris Damage / Broken Window	41	15-16		
1.W.10	West	Debris Damage / Broken Window	46	14A-15		
1.W.10	West	Broken Window	45	13-14		
1.W.10	West	Debris Damage / Broken Window	45	14A-15		
1.W.10	West	Broken Window	44	11-12, 13-14		
1.W.10	West	Debris Damage / Broken Window	44	14A-15		
1.W.10	West	Debris Damage	43	14A-15		
1.W.10	West	Debris Damage / Broken Window	42	14-15		
1.W.10	West	Debris Damage / Broken Window	41	14A-15		
1.W.10	West	Broken Window	40	14A-15		
1.W.10	West	Broken Window	38	14A-15		
1.W.10	West	Broken Window	31	5-6		
1.W.10	South	Debris Damage / Broken Window	45	15-16		
1.W.10	South	Debris Damage / Broken Window	44	15-16		
1.W.10	South	Debris Damage	43	15-16		
1.W.10	South	Debris Damage	42	15-16		
1.W.10	South	Debris Damage	41	15-16		
1.W.11	West	Debris Damage / Broken Window	46	14A-15		
1.W.11	West	Broken Window	45	13-14		
1.W.11	West	Debris Damage / Broken Window	45	14A-15		
1.W.11	West	Broken Window	44	11-12, 13-14		
1.W.11	West	Debris Damage / Broken Window	44	14A-15		
1.W.11	West	Debris Damage	43	14A-15		
1.W.11	West	Debris Damage / Broken Window	42	14-15		
1.W.11	West	Debris Damage / Broken Window	41	14A-15		
1.W.11	West	Broken Window	40	14A-15		
1.W.11	West	Broken Window	38	14A-15		
1.W.11	West	Broken Window	31	5-6		
1.W.11	South	Debris Damage / Broken Window	45	15-16		
1.W.11	South	Debris Damage / Broken Window	44	15-16		
1.W.11	South	Debris Damage	43	15-16		
1.W.11	South	Debris Damage	42	15-16		
1.W.11	South	Debris Damage	41	15-16		
1.W.12	West	Debris Damage / Broken Window	46	14A-15		

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.W.12	West	Broken Window	45	13-14		
1.W.12	West	Debris Damage / Broken Window	45	14A-15		
1.W.12	West	Broken Window	44	11-12, 13-14		
1.W.12	West	Debris Damage / Broken Window	44	14-15		
1.W.12	West	Debris Damage	43	14A-15		
1.W.12	West	Debris Damage / Broken Window	42	14-15		
1.W.12	West	Debris Damage / Broken Window	41	14A-15		
1.W.12	West	Broken Window	40	14A-15		
1.W.12	West	Broken Window	38	14A-15		
1.W.13	West	Debris Damage	46	14A-15		
1.W.13	West	Debris Damage	44	14A-15		
1.W.13	West	Debris Damage	42	14A-15		
1.W.13	West	Debris Damage	41	14A-15		
1.W.14	West	Debris Damage / Broken Window	42	14-15		
1.W.14	West	Broken Window	41	11-12		
1.W.14	West	Debris Damage / Broken Window	41	14A-15		
1.W.14	West	Broken Window	38	14A-15		
1.W.14	West	Broken Window	31	5-6		
1.W.14	West	Broken Window	22	3-4		
1.W.15	West	Broken Window	38	14A-15		
1.W.15	West	Broken Window	31	5-6		
1.W.15	West	Broken Window	22	3-4		
1.W.16	West	Debris Damage / Broken Window	14	13-15		
1.W.16	West	Broken Window	13	12-13		
1.W.16	West	Debris Damage / Broken Window	13	13-14		
1.W.16	West	Gash	13	14-15		
1.W.16	West	Broken Window	12	10-11, 12-13		
1.W.16	West	Debris Damage / Broken Window	12	13-14		
1.W.16	West	Gash	12	14-15		
1.W.16	West	Broken Window	11	9-10, 11-13		
1.W.16	West	Debris Damage / Broken Window	11	13-14		
1.W.16	West	Gash	11	14-15		
1.W.16	West	Broken Window	10	9-10, 11-12		
1.W.16	West	Gash	10	13-15		
1.W.16	West	Debris Damage	9	6-7		
1.W.16	West	Broken Window	9	10-13		
1.W.16	West	Gash	9	13-15		
1.W.16	West	Broken Window	8	6-7, 8-9, 10-12		
1.W.16	West	Debris Damage / Broken Window	8	12-15		
1.W.16	West	Broken Window	7	9-14		
1.W.16	West	Debris Damage / Broken Window	7	14-15		
1.W.16	West	Debris Damage / Broken Window	6	14-15		
1.W.16	West	Broken Window	4	5-9		
1.W.16	West	Debris Damage	4	14-15		
1.W.16	West	Broken Window	3	3-9		
1.W.16	West	Debris Damage	3	14-15		
1.W.16	West	Debris Damage	2	9-12, 14-15		
1.W.16	West	Debris Damage	1	9-15		
1.S.01	West	Debris Damage / Broken Window	46	14A-15	NIST	around 12:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.S.01	West	Broken Window	45	13-14	NIST	around 12:30PM
1.S.01	West	Debris Damage / Broken Window	45	14A-15	NIST	around 12:30PM
1.S.01	West	Debris Damage / Broken Window	44	14A-15	NIST	around 12:30PM
1.S.01	West	Debris Damage	43	14A-15	NIST	around 12:30PM
1.S.01	West	Debris Damage / Broken Window	42	14A-15	NIST	around 12:30PM
1.S.01	West	Debris Damage / Broken Window	41	14A-15	NIST	around 12:30PM
1.S.01	West	Broken Window	40	14A-15	NIST	around 12:30PM
1.S.01	South	Broken Window	47	16-19, 21-23	NIST	around 12:30PM
1.S.01	South	Gash	47	19-21	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	46	15-16	NIST	around 12:30PM
1.S.01	South	Broken Window	46	16-19, 21-23	NIST	around 12:30PM
1.S.01	South	Gash	46	19-21	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	45	15-16	NIST	around 12:30PM
1.S.01	South	Broken Window	45	16-19	NIST	around 12:30PM
1.S.01	South	Gash	45	19-21	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	44	15-16	NIST	around 12:30PM
1.S.01	South	Broken Window	44	16-20	NIST	around 12:30PM
1.S.01	South	Gash	44	19-21	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	43	15-16	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	42	15-16	NIST	around 12:30PM
1.S.01	South	Debris Damage / Broken Window	41	15-16	NIST	around 12:30PM
1.S.02	West	Debris Damage / Broken Window	46	14A-15	NIST	around 1:00PM
1.S.02	West	Debris Damage / Broken Window	45	14A-15	NIST	around 1:00PM
1.S.02	West	Debris Damage / Broken Window	44	14-15	NIST	around 1:00PM
1.S.02	West	Debris Damage / Broken Window	43	14A-15	NIST	around 1:00PM
1.S.02	West	Debris Damage / Broken Window	42	14A-15	NIST	around 1:00PM
1.S.02	West	Debris Damage / Broken Window	41	14A-15	NIST	around 1:00PM
1.S.02	West	Broken Window	38	14A-15	NIST	around 1:00PM
1.S.02	South	Broken Window	47	17-18	NIST	around 1:00PM
1.S.02	South	Gash	47	19-20	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	46	15-16	NIST	around 1:00PM
1.S.02	South	Gash	46	19-20	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	45	15-16	NIST	around 1:00PM
1.S.02	South	Broken Window	45	16-18	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	44	15-16	NIST	around 1:00PM
1.S.02	South	Broken Window	44	16-18	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	43	15-16	NIST	around 1:00PM
1.S.02	South	Broken Window	43	16-18	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	42	15-16	NIST	around 1:00PM
1.S.02	South	Broken Window	42	16-17	NIST	around 1:00PM
1.S.02	South	Debris Damage / Broken Window	41	15-16	NIST	around 1:00PM
1.S.02	South	Broken Window	41	16-17	NIST	around 1:00PM
1.S.02	South	Broken Window	40	16-17	NIST	around 1:00PM
1.S.02	South	Gash	37	19-20	NIST	around 1:00PM
1.S.02	South	Broken Window	37	20-21	NIST	around 1:00PM
1.S.02	South	Gash	36	19-20	NIST	around 1:00PM
1.S.02	South	Broken Window	36	20-21	NIST	around 1:00PM
1.S.02	South	Gash	35	19-20	NIST	around 1:00PM
1.S.02	South	Broken Window	35	20-21	NIST	around 1:00PM
1.S.02	South	Broken Window	34	15-16, 20-22	NIST	around 1:00PM
1.S.02	South	Gash	34	19-20	NIST	around 1:00PM
1.S.02	South	Gash	33	19-20	NIST	around 1:00PM
1.S.02	South	Broken Window	33	20-21	NIST	around 1:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
1.S.02	South	Gash	32	19-20	NIST	around 1:00PM
1.S.03	West	Debris Damage / Broken Window	46	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Broken Window	45	13-14	NIST	4:30PM-5:00PM
1.S.03	West	Debris Damage / Broken Window	45	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Broken Window	44	13-14	NIST	4:30PM-5:00PM
1.S.03	West	Debris Damage / Broken Window	44	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Debris Damage / Broken Window	43	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Debris Damage / Broken Window	42	14-15	NIST	4:30PM-5:00PM
1.S.03	West	Debris Damage / Broken Window	41	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Broken Window	40	14A-15	NIST	4:30PM-5:00PM
1.S.03	West	Broken Window	38	14A-15	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	46	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	45	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	45	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	44	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	44	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	43	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	43	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	42	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	42	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Debris Damage / Broken Window	41	15-16	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	41	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	40	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	39	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	38	15-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	37	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	36	16-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	35	15-19	NIST	4:30PM-5:00PM
1.S.03	South	Broken Window	34	15-19	NIST	4:30PM-5:00PM
1.S.04	West	Debris Damage / Broken Window	46	14A-15		
1.S.04	West	Broken Window	45	13-14		
1.S.04	West	Debris Damage / Broken Window	45	14A-15		
1.S.04	West	Broken Window	44	11-12, 13-14		
1.S.04	West	Debris Damage / Broken Window	44	14A-15		
1.S.04	West	Debris Damage	43	14A-15		
1.S.04	West	Debris Damage / Broken Window	42	14-15		
1.S.04	West	Debris Damage / Broken Window	41	14A-15		
1.S.04	South	Gash	47	19-21		
1.S.04	South	Debris Damage / Broken Window	46	15-16		
1.S.04	South	Gash	46	19-21		
1.S.04	South	Debris Damage / Broken Window	45	15-16, 18-19		
1.S.04	South	Broken Window	45	16-19		
1.S.04	South	Gash	45	19-21		
1.S.04	South	Debris Damage / Broken Window	44	15-16		
1.S.04	South	Broken Window	44	16-19		
1.S.04	South	Gash	44	20-21		
1.S.04	South	Debris Damage / Broken Window	43	15-16		
1.S.04	South	Broken Window	43	16-19		
1.S.04	South	Debris Damage / Broken Window	42	15-16		
1.S.04	South	Debris Damage / Broken Window	41	15-16		
1.S.05	South	Smoke Obscures	All	All		

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
2.W.01	West	Debris Damage / Broken Window	46	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Broken Window	45	13-14	GNA	est 10:30AM-12:30PM
2.W.01	West	Debris Damage / Broken Window	45	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Debris Damage / Broken Window	44	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Debris Damage	43	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Debris Damage / Broken Window	42	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Debris Damage / Broken Window	41	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Broken Window	40	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Broken Window	38	14A-15	GNA	est 10:30AM-12:30PM
2.W.01	West	Broken Window	31	5-6	GNA	est 10:30AM-12:30PM
2.W.01	West	Burned-out	29	12-15	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage	46	15-16	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage / Broken Window	45	15-16	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage / Broken Window	44	15-16	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage	43	15-16	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage / Broken Window	42	15-16	GNA	est 10:30AM-12:30PM
2.W.01	South	Debris Damage / Broken Window	41	15-16	GNA	est 10:30AM-12:30PM
2.W.02	West	Debris Damage	43	14A-15	FILE	11:33:21AM
2.W.02	West	Debris Damage	41	14A-15	FILE	11:33:21AM
2.W.02	West	Burned-out?	30	14-15	FILE	11:33:21AM
2.W.02	West	Burned-out	29	11?-15	FILE	11:33:21AM
3.W.01	West	Broken Window	25	13-14	GNA	est 12:10PM-12:25PM
3.W.01	West	Debris Damage	25	14A-15	GNA	est 12:10PM-12:25PM
3.W.01	West	Broken Window	24	14A-15	GNA	est 12:10PM-12:25PM
3.W.01	West	Internal Fire / Broken Window	22	14A-15	GNA	est 12:10PM-12:25PM
3.W.01	West	Broken Window	21	14-15	GNA	est 12:10PM-12:25PM
3.W.01	West	Debris Damage	20	14A-15	GNA	est 12:10PM-12:25PM
3.W.02	West	Broken Window	23	13-14	NIST	12:10PM-12:25PM
3.W.02	West	Internal Fire / Broken Window	22	14A-15	NIST	12:10PM-12:25PM
3.W.02	West	Broken Window	21	14-15	NIST	12:10PM-12:25PM
3.W.02	South	Smoke	23	15-16	NIST	12:10PM-12:25PM
3.W.02	South	Smoke	22	15-16	NIST	12:10PM-12:25PM
3.W.02	South	Burned-out	21	15-16	NIST	12:10PM-12:25PM
3.W.03	West	Internal Fire	29	11-12	GNA	est 12:10PM-12:27PM
3.W.03	West	Smoke	29	12-15	GNA	est 12:10PM-12:27PM
3.W.03	West	Broken Window	25	13-14	GNA	est 12:10PM-12:27PM
3.W.03	West	Broken Window	24	14A-15	GNA	est 12:10PM-12:27PM
3.W.03	West	Broken Window	23	13-14	GNA	est 12:10PM-12:27PM
3.W.03	West	Burned-out	22	14A-15	GNA	est 12:10PM-12:27PM
3.W.04	West	Broken Window	45	13-14	GNA	est 12:10PM-12:28PM
3.W.04	West	Debris Damage	45	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Broken Window	44	13-14	GNA	est 12:10PM-12:28PM
3.W.04	West	Debris Damage / Broken Window	44	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Debris Damage / Broken Window	42	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Burned-out	30	14-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Burned-out	29	11-15	GNA	est 12:10PM-12:28PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.04	West	Broken Window	25	13-14	GNA	est 12:10PM-12:28PM
3.W.04	West	Broken Window	24	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Broken Window	23	13-14	GNA	est 12:10PM-12:28PM
3.W.04	West	Burned-out?	22	14A-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Broken Window	21	14-15	GNA	est 12:10PM-12:28PM
3.W.04	West	Burned-out	19	14-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	45	13-14	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	44	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage	43	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	40	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	38	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Burned-out	30	13-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Burned-out	29	11-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	25	13-14	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	24	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	23	13-14	GNA	est 12:10PM-12:28PM
3.W.05	West	Burned-out	22	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Broken Window	21	14-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage	20	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Burned-out	19	14-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage / Broken Window	18	14-15	GNA	est 12:10PM-12:28PM
3.W.05	West	Debris Damage	17	14A-15	GNA	est 12:10PM-12:28PM
3.W.05	South	Debris Damage	20	15-16	GNA	est 12:10PM-12:28PM
3.W.05	South	Debris Damage	19	15-16	GNA	est 12:10PM-12:28PM
3.W.06	West	Debris Damage / Broken Window	46	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	45	13-14	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	45	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	44	13-14	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	44	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage	43	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	42	14-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	41	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	40	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	38	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Burned-out	30	13-14	FILE	12:27:17PM +/-1s
3.W.06	West	Smoke	30	14-15	FILE	12:27:17PM +/-1s
3.W.06	West	Internal Fire / Broken Window	29	11-13	FILE	12:27:17PM +/-1s
3.W.06	West	Smoke	29	13-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	25	13-14	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage	25	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	24	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	23	13-14	FILE	12:27:17PM +/-1s
3.W.06	West	Burned-out	22	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Broken Window	21	14-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	20	14A-15	FILE	12:27:17PM +/-1s
3.W.06	West	Burned-out	19	14-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage / Broken Window	18	14-15	FILE	12:27:17PM +/-1s
3.W.06	West	Debris Damage	17	14A-15	FILE	12:27:17PM +/-1s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.07	West	Broken Window	40	14A-15	NIST	12:27:30PM +/-1s
3.W.07	West	Broken Window	38	14A-15	NIST	12:27:30PM +/-1s
3.W.07	West	Burned-out	30	13-14	NIST	12:27:30PM +/-1s
3.W.07	West	Smoke	30	14-15	NIST	12:27:30PM +/-1s
3.W.07	West	Internal Fire / Broken Window	29	11-13	NIST	12:27:30PM +/-1s
3.W.07	West	Burned-out	29	13-15	NIST	12:27:30PM +/-1s
3.W.07	West	Broken Window	25	13-14	NIST	12:27:30PM +/-1s
3.W.07	West	Debris Damage	25	14A-15	NIST	12:27:30PM +/-1s
3.W.07	West	Broken Window	24	14A-15	NIST	12:27:30PM +/-1s
3.W.07	West	Broken Window	23	13-14	NIST	12:27:30PM +/-1s
3.W.07	West	Burned-out	22	14A-15	NIST	12:27:30PM +/-1s
3.W.07	South	Debris Damage	25	15-16	NIST	12:27:30PM +/-1s
3.W.08	West	Burned-out	30	12-15	GNA	est 12:27PM-12:28PM
3.W.08	West	Internal Fire / Broken Window	29	11-13	GNA	est 12:27PM-12:28PM
3.W.08	West	Burned-out	29	13-15	GNA	est 12:27PM-12:28PM
3.W.08	West	Debris Damage	25	14A-15	GNA	est 12:27PM-12:28PM
3.W.08	South	External Fire / Broken Window	30	15-16	GNA	est 12:27PM-12:28PM
3.W.09	West	Broken Window	38	14A-15	FILE	12:28:40PM +/-1s
3.W.09	West	Burned-out	30	12-14	FILE	12:28:40PM +/-1s
3.W.09	West	Internal Fire / Broken Window	30	14-15	FILE	12:28:40PM +/-1s
3.W.09	West	Burned-out	29	11-12, 13-15	FILE	12:28:40PM +/-1s
3.W.09	West	Internal Fire / Broken Window	29	12-13	FILE	12:28:40PM +/-1s
3.W.09	West	Broken Window	25	13-14	FILE	12:28:40PM +/-1s
3.W.09	West	Debris Damage	25	14A-15	FILE	12:28:40PM +/-1s
3.W.09	West	Broken Window	24	14A-15	FILE	12:28:40PM +/-1s
3.W.09	West	Broken Window	23	13-14	FILE	12:28:40PM +/-1s
3.W.09	West	Smoke	22	14A-15	FILE	12:28:40PM +/-1s
3.W.09	South	External Fire / Broken Window	30	15-17	FILE	12:28:40PM +/-1s
3.W.09	South	Burned-out	29	15-16	FILE	12:28:40PM +/-1s
3.W.09	South	Debris Damage	25	15-16	FILE	12:28:40PM +/-1s
3.W.09	South	Smoke Obscures	31+	15-16	FILE	12:28:40PM +/-1s
3.W.10	West	Burned-out	30	12-14	GNA	est 12:28PM-12:31PM
3.W.10	West	Internal Fire / Broken Window	30	14-15	GNA	est 12:28PM-12:31PM
3.W.10	West	Internal Fire / Broken Window	29	11-13	GNA	est 12:28PM-12:31PM
3.W.10	West	Burned-out	29	13-15	GNA	est 12:28PM-12:31PM
3.W.10	West	Broken Window	25	13-14	GNA	est 12:28PM-12:31PM
3.W.10	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:31PM
3.W.10	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:31PM
3.W.10	South	External Fire / Broken Window	30	15-16	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	45	13-14	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	44	11-12, 13-14	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	44	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	41	11-12	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	38	14A-15	GNA	est 12:28PM-12:31PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.11	West	Burned-out	30	12-14	GNA	est 12:28PM-12:31PM
3.W.11	West	Internal Fire / Broken Window	30	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Internal Fire / Broken Window	29	11-13	GNA	est 12:28PM-12:31PM
3.W.11	West	Burned-out	29	13-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	25	13-14	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	23	13-14	GNA	est 12:28PM-12:31PM
3.W.11	West	Burned-out	22	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Broken Window	21	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	20	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Burned-out	19	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	18	14-15	GNA	est 12:28PM-12:31PM
3.W.11	West	Debris Damage / Broken Window	17	14A-15	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage	44	15-16	GNA	est 12:28PM-12:31PM
3.W.11	South	External Fire / Broken Window	30	15-16	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage	19	15-16	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage	17	15-16	GNA	est 12:28PM-12:31PM
3.W.11	South	Broken Window	14	22-25	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage / Broken Window	11	19-20	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage / Broken Window	10	19-20	GNA	est 12:28PM-12:31PM
3.W.11	South	Debris Damage / Broken Window	9	19-20	GNA	est 12:28PM-12:31PM
3.W.12	West	Burned-out	30	12-14	NIST	12:28PM +/- 180s
3.W.12	West	Internal Fire / Broken Window	30	14-15	NIST	12:28PM +/- 180s
3.W.12	West	Internal Fire / Broken Window	29	11-13	NIST	12:28PM +/- 180s
3.W.12	West	Burned-out	29	13-15	NIST	12:28PM +/- 180s
3.W.12	South	External Fire / Broken Window	30	15-17	NIST	12:28PM +/- 180s
3.W.12	South	Burned-out	29	15-16	NIST	12:28PM +/- 180s
3.W.13	West	Burned-out	30	12-14A	GNA	est 12:28PM-12:32PM
3.W.13	West	Internal Fire / Broken Window	30	14A-15	GNA	est 12:28PM-12:32PM
3.W.13	West	Internal Fire / Broken Window	29	11-13	GNA	est 12:28PM-12:32PM
3.W.13	West	Burned-out	29	13-15	GNA	est 12:28PM-12:32PM
3.W.13	West	Broken Window	25	13-14	GNA	est 12:28PM-12:32PM
3.W.13	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:32PM
3.W.13	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:32PM
3.W.13	South	External Fire / Broken Window	30	15-17	GNA	est 12:28PM-12:32PM
3.W.13	South	Debris Damage	25	15-16	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	45	13-14	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	44	11-12, 13-14	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage / Broken Window	44	14-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage	43	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	40	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	38	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Burned-out	30	12-14A	GNA	est 12:28PM-12:32PM
3.W.14	West	Internal Fire / Broken Window	30	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Internal Fire / Broken Window	29	11-13	GNA	est 12:28PM-12:32PM
3.W.14	West	Burned-out	29	13-15	GNA	est 12:28PM-12:32PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.14	West	Broken Window	25	13-14	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	23	13-14	GNA	est 12:28PM-12:32PM
3.W.14	West	Burned-out	22	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Broken Window	21	14-15	GNA	est 12:28PM-12:32PM
3.W.14	West	Debris Damage	20	14A-15	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	46	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	45	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	44	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	43	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	42	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	External Fire / Broken Window	30	15-16	GNA	est 12:28PM-12:32PM
3.W.14	South	Debris Damage	25	15-16	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage	44	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Broken Window	41	11-12	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Broken Window	38	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Smoke	30	12-14	GNA	est 12:28PM-12:32PM
3.W.15	West	Burned-out	30	14-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Burned-out	29	11-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Broken Window	25	13-14	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Burned-out	22	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Broken Window	21	14-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage	20	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Burned-out	19	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	West	Debris Damage	18	14A-15	GNA	est 12:28PM-12:32PM
3.W.15	South	Debris Damage	20	15-16	GNA	est 12:28PM-12:32PM
3.W.15	South	Debris Damage	19	15-16	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	45	13-14	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	44	11-12, 13-14	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage / Broken Window	44	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	41	11-12	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	38	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Burned-out	30	12-13, 14-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Smoke	30	13-14	GNA	est 12:28PM-12:32PM
3.W.16	West	Burned-out	29	12-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	25	13-14	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage	25	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	24	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Burned-out	22	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Broken Window	21	14-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Debris Damage	20	14A-15	GNA	est 12:28PM-12:32PM
3.W.16	West	Burned-out	19	14A-15	GNA	est 12:28PM-12:32PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.17	West	Broken Window	40	14A-15	FILE	12:32:55PM +/-1s
3.W.17	West	Broken Window	38	14A-15	FILE	12:32:55PM +/-1s
3.W.17	West	Burned-out	30	13-15	FILE	12:32:55PM +/-1s
3.W.17	West	Burned-out	29	13-15	FILE	12:32:55PM +/-1s
3.W.17	West	Debris Damage	25	14A-15	FILE	12:32:55PM +/-1s
3.W.17	West	Broken Window	24	14A-15	FILE	12:32:55PM +/-1s
3.W.17	West	Burned-out	22	14A-15	FILE	12:32:55PM +/-1s
3.W.17	South	External Fire / Broken Window	30	15-17	FILE	12:32:55PM +/-1s
3.W.17	South	Debris Damage	25	15-16	FILE	12:32:55PM +/-1s
3.W.18	West	Broken Window	40	14A-15	FILE	12:33:03PM +/-1s
3.W.18	West	Broken Window	38	14A-15	FILE	12:33:03PM +/-1s
3.W.18	West	Burned-out	30	12-15	FILE	12:33:03PM +/-1s
3.W.18	West	Burned-out	29	12-15	FILE	12:33:03PM +/-1s
3.W.18	West	Debris Damage	25	14A-15	FILE	12:33:03PM +/-1s
3.W.18	South	External Fire / Broken Window	30	15-17	FILE	12:33:03PM +/-1s
3.W.19	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Broken Window	45	13-14	GNA	est 12:30PM-1:00PM
3.W.19	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Broken Window	44	11-12, 13-14	GNA	est 12:30PM-1:00PM
3.W.19	West	Debris Damage / Broken Window	44	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Debris Damage	43	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Debris Damage / Broken Window	42	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Broken Window	41	11-12	GNA	est 12:30PM-1:00PM
3.W.19	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Burned-out	30	12-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Burned-out	29	11-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Broken Window	24	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Burned-out	22	14A-15	GNA	est 12:30PM-1:00PM
3.W.19	West	Broken Window	21	14-15	GNA	est 12:30PM-1:00PM
3.W.20	West	Burned-out	22	14A-15	NIST	shortly before 12:46:39PM
3.W.20	West	Broken Window	21	14-15	NIST	shortly before 12:46:39PM
3.W.20	West	Burned-out	19	14A-15	NIST	shortly before 12:46:39PM
3.W.20	West	Debris Damage	18	14A-15	NIST	shortly before 12:46:39PM
3.W.20	South	Debris Damage / Broken Window	14	20-21	NIST	shortly before 12:46:39PM
3.W.20	South	Debris Damage / Broken Window	13	20-21	NIST	shortly before 12:46:39PM
3.W.20	South	Debris Damage / Broken Window	12	20-21	NIST	shortly before 12:46:39PM
3.W.21	West	Burned-out	22	14A-15	NIST	shortly after 12:30PM
3.W.21	West	Broken Window	21	14-15	NIST	shortly after 12:30PM
3.W.21	West	Burned-out	19	14A-15	NIST	shortly after 12:30PM
3.W.21	West	Smoke	18	14A-15	NIST	shortly after 12:30PM
3.W.21	South	Debris Damage / Broken Window	11?	19-20?	NIST	shortly after 12:30PM
3.W.21	South	Debris Damage / Broken Window	10?	19-20?	NIST	shortly after 12:30PM
3.W.22	West	Burned-out	30	12-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Burned-out	29	12-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Broken Window	25	13-14	GNA	est 12:30PM-1:00PM
3.W.22	West	Debris Damage	25	14A-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Broken Window	24	14A-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Burned-out	22	14A-15	GNA	est 12:30PM-1:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.22	West	Broken Window	21	14-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Debris Damage	20	14A-15	GNA	est 12:30PM-1:00PM
3.W.22	West	Burned-out	19	14A-15	GNA	est 12:30PM-1:00PM
3.W.22	South	Internal Fire / Broken Window	30	15-16	GNA	est 12:30PM-1:00PM
3.W.23	West	Burned-out	30	12-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Burned-out	29	11-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Broken Window	25	13-14	GNA	est 12:30PM-1:00PM
3.W.23	West	Debris Damage	25	14A-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Broken Window	24	14A-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Burned-out	22	14A-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Broken Window	21	14-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Debris Damage	20	14A-15	GNA	est 12:30PM-1:00PM
3.W.23	West	Burned-out	19	14A-15	GNA	est 12:30PM-1:00PM
3.W.24	West	Debris Damage / Broken Window	46	14A-15	GNA	est after 12:40PM
3.W.24	West	Debris Damage	45	14A-15	GNA	est after 12:40PM
3.W.24	West	Broken Window	44	11-12	GNA	est after 12:40PM
3.W.24	West	Debris Damage / Broken Window	44	14A-15	GNA	est after 12:40PM
3.W.24	West	Debris Damage	43	14A-15	GNA	est after 12:40PM
3.W.24	West	Debris Damage / Broken Window	42	14-15	GNA	est after 12:40PM
3.W.24	West	Debris Damage / Broken Window	41	14A-15	GNA	est after 12:40PM
3.W.24	West	Broken Window	40	14A-15	GNA	est after 12:40PM
3.W.24	West	Burned-out	30	12-15	GNA	est after 12:40PM
3.W.24	West	Burned-out	29	11-15	GNA	est after 12:40PM
3.W.24	South	Broken Window	47	16-19, 21-24	GNA	est after 12:40PM
3.W.24	South	Gash	47	19-21	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	46	15-16	GNA	est after 12:40PM
3.W.24	South	Broken Window	46	16-19, 21-24	GNA	est after 12:40PM
3.W.24	South	Gash	46	19-21	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	45	15-16	GNA	est after 12:40PM
3.W.24	South	Broken Window	45	16-19	GNA	est after 12:40PM
3.W.24	South	Gash	45	19-21	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	44	15-16	GNA	est after 12:40PM
3.W.24	South	Broken Window	44	16-19	GNA	est after 12:40PM
3.W.24	South	Gash	44	19-21	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	43	15-16	GNA	est after 12:40PM
3.W.24	South	Broken Window	43	16-19	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	42	15-16	GNA	est after 12:40PM
3.W.24	South	Broken Window	42	17-19	GNA	est after 12:40PM
3.W.24	South	Debris Damage / Broken Window	41	15-16	GNA	est after 12:40PM
3.W.25	West	Burned-out	29	11-15	NIST	12:46:39PM
3.W.25	West	Broken Window	25	13-14	NIST	12:46:39PM
3.W.25	West	Debris Damage	25	14A-15	NIST	12:46:39PM
3.W.25	West	Broken Window	24	14A-15	NIST	12:46:39PM
3.W.25	West	Burned-out	22	14A-15	NIST	12:46:39PM
3.W.25	West	Broken Window	21	14-15	NIST	12:46:39PM
3.W.25	West	Debris Damage	20	14A-15	NIST	12:46:39PM
3.W.25	West	Burned-out	19	14A-15	NIST	12:46:39PM
3.W.25	West	Debris Damage	18	14A-15	NIST	12:46:39PM
3.W.25	South	Debris Damage	25	15-16	NIST	12:46:39PM
3.W.25	South	Debris Damage	20	15-16	NIST	12:46:39PM
3.W.25	South	Debris Damage	19	15-16	NIST	12:46:39PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.25	South	Gash	14?	18-20?	NIST	12:46:39PM
3.W.25	South	Debris Damage / Broken Window	14?	20-22?	NIST	12:46:39PM
3.W.25	South	Broken Window	14?	20-22?	NIST	12:46:39PM
3.W.25	South	Gash	13?	18-20?	NIST	12:46:39PM
3.W.25	South	Debris Damage / Broken Window	13?	20-21?	NIST	12:46:39PM
3.W.25	South	Broken Window	13?	20-21?	NIST	12:46:39PM
3.W.25	South	Gash	12?	18-19?	NIST	12:46:39PM
3.W.25	South	Debris Damage / Broken Window	12?	19-20?	NIST	12:46:39PM
3.W.26	West	Burned-out	30	12-15	FILE	12:46:48PM +/-1s
3.W.26	West	Burned-out	29	11-15	FILE	12:46:48PM +/-1s
3.W.26	West	Broken Window	25	13-14	FILE	12:46:48PM +/-1s
3.W.26	West	Debris Damage	25	14A-15	FILE	12:46:48PM +/-1s
3.W.26	West	Broken Window	24	14A-15	FILE	12:46:48PM +/-1s
3.W.26	West	Burned-out	22	14A-15	FILE	12:46:48PM +/-1s
3.W.26	West	Broken Window	21	14-15	FILE	12:46:48PM +/-1s
3.W.26	West	Debris Damage	20	14A-15	FILE	12:46:48PM +/-1s
3.W.26	West	Burned-out	19	14A-15	FILE	12:46:48PM +/-1s
3.W.26	West	Debris Damage	18	14A-15	FILE	12:46:48PM +/-1s
3.W.26	South	Debris Damage	25	15-16	FILE	12:46:48PM +/-1s
3.W.26	South	Debris Damage	20	15-16	FILE	12:46:48PM +/-1s
3.W.26	South	Debris Damage	19	15-16	FILE	12:46:48PM +/-1s
3.W.26	South	Broken Window	15?	21-22?	FILE	12:46:48PM +/-1s
3.W.26	South	Broken Window	14?	21-22?	FILE	12:46:48PM +/-1s
3.W.27	West	Burned-out	30	12-15	FILE	12:47:40PM +/-1s
3.W.27	West	Burned-out	29	11-15	FILE	12:47:40PM +/-1s
3.W.27	West	Broken Window	25	13-14	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	25	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Broken Window	24	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Broken Window	23	13-14	FILE	12:47:40PM +/-1s
3.W.27	West	Burned-out	22	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Broken Window	21	13-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage / Broken Window	20	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Burned-out	19	14-15	FILE	12:47:40PM +/-1s
3.W.27	West	Smoke	18	14-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage / Broken Window	17	14-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	16	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	15	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	14	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	13	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Debris Damage	12	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Gash	11	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Gash	10	14A-15	FILE	12:47:40PM +/-1s
3.W.27	West	Gash	9	14A-15	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage	25	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage	21	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage / Broken Window	20	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage	19	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Smoke Obscures	18	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Smoke Obscures	17	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Smoke Obscures	16	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage	15	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage	14	15-16	FILE	12:47:40PM +/-1s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.27	South	Debris Damage	13	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Gash	12	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Gash	11	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Gash	10	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Gash	9	15-16	FILE	12:47:40PM +/-1s
3.W.27	South	Debris Damage / Broken Window	8	15-16	FILE	12:47:40PM +/-1s
3.W.28	West	Debris Damage	43	14A-15	GNA	est 12:30PM-2:00PM
3.W.28	West	Debris Damage	42	14A-15	GNA	est 12:30PM-2:00PM
3.W.28	West	Debris Damage	41	14A-15	GNA	est 12:30PM-2:00PM
3.W.28	West	Burned-out	30	12?-15	GNA	est 12:30PM-2:00PM
3.W.28	West	Burned-out	29	11?-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage	46	14A-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Broken Window	45	13-14	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage	45	14A-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage	44	14A-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage	43	14A-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Debris Damage	41	14A-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Burned-out	30	12-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Burned-out	29	11-15	GNA	est 12:30PM-2:00PM
3.W.29	West	Broken Window	25	13-14	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	45	13-14	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage	44	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	38	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Burned-out	30	12-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Burned-out	29	11-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	25	13-14	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	24	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	23	13-14	GNA	est 12:30PM-2:00PM
3.W.30	West	Burned-out	22	14-15?	GNA	est 12:30PM-2:00PM
3.W.30	West	Broken Window	21	14-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Debris Damage	20	14A-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Burned-out	19	14-15	GNA	est 12:30PM-2:00PM
3.W.30	West	Smoke	18	14-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	46	14A-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Broken Window	45	13-14	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	45	14A-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	44	14A-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	43	14A-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	42	14-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Debris Damage / Broken Window	41	14A-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Burned-out	30	12-15	GNA	est 12:30PM-2:00PM
3.W.31	West	Burned-out	29	11-15	GNA	est 12:30PM-2:00PM
3.W.32	West	Broken Window	24	14A-15	GNA	est 12:47PM-1:03PM
3.W.32	West	Smoke	22	14A?-15	GNA	est 12:47PM-1:03PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
3.W.32	West	Debris Damage	20	14A-15	GNA	est 12:47PM-1:03PM
3.W.32	West	Burned-out	19	14A-15	GNA	est 12:47PM-1:03PM
3.S.01	West	Debris Damage / Broken Window	44	14A-15	GNA	est after 12:40PM
3.S.01	West	Debris Damage / Broken Window	41	14A-15	GNA	est after 12:40PM
3.S.01	South	Debris Damage / Broken Window	45	15-16	GNA	est after 12:40PM
3.S.01	South	Debris Damage / Broken Window	44	15-16	GNA	est after 12:40PM
3.S.01	South	Debris Damage / Broken Window	41	15-16	GNA	est after 12:40PM
3.S.01	South	Gash	38	19-20	GNA	est after 12:40PM
3.S.01	South	Gash	37	19-20	GNA	est after 12:40PM
3.S.01	South	Gash	36	19-20	GNA	est after 12:40PM
3.S.01	South	Gash	35	19-20	GNA	est after 12:40PM
3.S.01	South	Burned-out	29	15-17	GNA	est after 12:40PM
4.W.01	West	Debris Damage / Broken Window	46	14A-15	NIST	around 1:00PM
4.W.01	West	Debris Damage / Broken Window	45	14A-15	NIST	around 1:00PM
4.W.01	West	Debris Damage / Broken Window	44	14A-15	NIST	around 1:00PM
4.W.01	West	Debris Damage / Broken Window	42	14A-15	NIST	around 1:00PM
4.W.01	West	Debris Damage / Broken Window	41	14A-15	NIST	around 1:00PM
4.W.01	West	Burned-out	29	11-15	NIST	around 1:00PM
4.W.01	West	Debris Damage	25	14A-15	NIST	around 1:00PM
4.W.01	West	Smoke?	22	13-15	NIST	around 1:00PM
4.W.01	South	Broken Window	47	17-18	NIST	around 1:00PM
4.W.01	South	Debris Damage / Broken Window	46	15-16	NIST	around 1:00PM
4.W.01	South	Debris Damage / Broken Window	45	15-16	NIST	around 1:00PM
4.W.01	South	Debris Damage / Broken Window	44	15-16	NIST	around 1:00PM
4.W.01	South	Gash	28	19-20	NIST	around 1:00PM
4.W.01	South	Broken Window	28	20-22	NIST	around 1:00PM
4.W.01	South	Gash	27	19-20	NIST	around 1:00PM
4.W.01	South	Broken Window	27	20-22	NIST	around 1:00PM
4.W.01	South	Gash	26	19-20	NIST	around 1:00PM
4.W.01	South	Broken Window	26	20-22	NIST	around 1:00PM
4.W.01	South	Gash	25	19-20	NIST	around 1:00PM
4.W.01	South	Broken Window	26	20-21	NIST	around 1:00PM
4.W.01	South	Gash	24	19-20	NIST	around 1:00PM
4.W.02	West	Burned-out	30	12-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Burned-out	29	12-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Broken Window	24	14A-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Smoke	22	14?-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Broken Window	21	14-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Debris Damage	20	14A-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Burned-out	19	14A-15	FILE	1:03:44PM +/- 1s
4.W.02	West	Smoke?	18	14A-15	FILE	1:03:44PM +/- 1s
4.W.03	West	Debris Damage / Broken Window	46	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Broken Window	45	13-14	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage / Broken Window	45	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Broken Window	44	11-12, 13-14	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage / Broken Window	44	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage	43	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage / Broken Window	42	14-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage / Broken Window	41	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Broken Window	40	14A-15	GNA	est 1:00PM-1:45PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.03	West	Broken Window	38	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Burned-out	30	14-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Burned-out	29	14-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Debris Damage	25	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Broken Window	24	14A-15	GNA	est 1:00PM-1:45PM
4.W.03	West	Smoke	22	14A-15	GNA	est 1:00PM-1:45PM
4.W.04	West	Burned-out	30	12-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Burned-out	29	11-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Broken Window	25	13-14	GNA	est 1:00PM-2:00PM
4.W.04	West	Broken Window	24	14A-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Broken Window	23	13-14	GNA	est 1:00PM-2:00PM
4.W.04	West	Smoke	22	13-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Broken Window	21	14-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Burned-out	19	14-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Smoke	18	14-15	GNA	est 1:00PM-2:00PM
4.W.04	West	Debris Damage / Broken Window	17	14-15	GNA	est 1:00PM-2:00PM
4.W.05	West	Burned-out	30	12-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Burned-out	29	13-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Broken Window	25	13-14	GNA	est 1:00PM-1:45PM
4.W.05	West	Debris Damage	25	14A-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Broken Window	24	14A-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Burned-out	22	14-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Broken Window	21	14-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Burned-out	19	14A-15	GNA	est 1:00PM-1:45PM
4.W.05	West	Smoke?	18	14A-15	GNA	est 1:00PM-1:45PM
4.W.06	West	Debris Damage	25	14A-15	FILE	1:12:04PM +/-1s
4.W.06	West	Broken Window	24	14A-15	FILE	1:12:04PM +/-1s
4.W.06	West	Burned-out	22	14A-15	FILE	1:12:04PM +/-1s
4.W.07	West	Broken Window	24	14A-15	GNA	est 1:00PM-2:00PM
4.W.07	West	Burned-out	22	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Burned-out	30	12-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Burned-out	29	11-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Broken Window	25	13-14	GNA	est 1:00PM-2:00PM
4.W.08	West	Debris Damage	25	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Broken Window	24	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Smoke	22	14-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Broken Window	21	14-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Burned-out	19	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	West	Smoke	18	14A-15	GNA	est 1:00PM-2:00PM
4.W.08	South	Debris Damage	19	15-16	GNA	est 1:00PM-2:00PM
4.W.08	South	Debris Damage / Broken Window	11	19-21	GNA	est 1:00PM-2:00PM
4.W.08	South	Broken Window	11	21-23	GNA	est 1:00PM-2:00PM
4.W.08	South	Debris Damage / Broken Window	10	19-21	GNA	est 1:00PM-2:00PM
4.W.08	South	Broken Window	10	21-22	GNA	est 1:00PM-2:00PM
4.W.09	West	Broken Window	28	9-10	FILE	1:29:46PM +/-1s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.09	West	Broken Window	25	13-14	FILE	1:29:46PM +/-1s
4.W.09	West	Debris Damage	25	14A-15	FILE	1:29:46PM +/-1s
4.W.09	West	Broken Window	24	14A-15	FILE	1:29:46PM +/-1s
4.W.09	West	Broken Window	23	12-14	FILE	1:29:46PM +/-1s
4.W.09	West	Smoke	22	13-15	FILE	1:29:46PM +/-1s
4.W.09	West	Broken Window	21	13-15	FILE	1:29:46PM +/-1s
4.W.09	West	Debris Damage / Broken Window	20	14A-15	FILE	1:29:46PM +/-1s
4.W.09	West	Burned-out	19	14-15	FILE	1:29:46PM +/-1s
4.W.09	South	Debris Damage	25	15-16	FILE	1:29:46PM +/-1s
4.W.09	South	Debris Damage / Broken Window	20	15-16	FILE	1:29:46PM +/-1s
4.W.10	West	Debris Damage / Broken Window	15	14-14A	NIST	1:30PM-2:30PM
4.W.10	West	Gash	15	14A-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	14	11-12	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	14	14-14A	NIST	1:30PM-2:30PM
4.W.10	West	Gash	14	14A-15	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	13	13-14	NIST	1:30PM-2:30PM
4.W.10	West	Gash	13	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Smoke	12	10-11	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	12	12-14	NIST	1:30PM-2:30PM
4.W.10	West	Gash	12	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	11	9-10, 11-14	NIST	1:30PM-2:30PM
4.W.10	West	Gash	11	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	10	9-10	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	10	11-13	NIST	1:30PM-2:30PM
4.W.10	West	Gash	10	13-15	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage	9	6-7	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	9	11-13	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	9	10-11	NIST	1:30PM-2:30PM
4.W.10	West	Gash	9	13-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	8	6-7, 8-9, 10-12	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	8	12-15	NIST	1:30PM-2:30PM
4.W.10	West	Smoke	7	2-3, 5-9	NIST	1:30PM-2:30PM
4.W.10	West	Burned-out	7	9-11	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	7	11-14	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	7	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage / Broken Window	6	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	4	5-9	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage	4	14-15	NIST	1:30PM-2:30PM
4.W.10	West	Broken Window	3	3-9	NIST	1:30PM-2:30PM
4.W.10	West	Debris Damage	3	14-15	NIST	1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	14	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	13	13-14	GNA	est 1:30PM-2:30PM
4.W.11	West	Gash	13	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Broken Window	12	10-11, 12-13	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	12	13-14	GNA	est 1:30PM-2:30PM
4.W.11	West	Gash	12	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Broken Window	11	9-10, 11-13	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	11	13-14	GNA	est 1:30PM-2:30PM
4.W.11	West	Gash	11	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Broken Window	10	9-10, 11-13	GNA	est 1:30PM-2:30PM
4.W.11	West	Gash	10	13-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage	9	6-7	GNA	est 1:30PM-2:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.11	West	Broken Window	9	10-12	GNA	est 1:30PM-2:30PM
4.W.11	West	Smoke Obscures	9	12-13	GNA	est 1:30PM-2:30PM
4.W.11	West	Gash	9	13-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Broken Window	8	6-7, 8-9, 10-12	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	8	12-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Smoke	7	2-3, 5-8	GNA	est 1:30PM-2:30PM
4.W.11	West	Burned-out?	7	8-9	GNA	est 1:30PM-2:30PM
4.W.11	West	Broken Window	7	9-13	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	7	13-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage / Broken Window	6	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage	4	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage	3	14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage	2	9-12, 14-15	GNA	est 1:30PM-2:30PM
4.W.11	West	Debris Damage	1	9-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	14	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage	13	13-14	GNA	est 1:30PM-2:30PM
4.W.12	West	Gash	13	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	12	10-11, 12-13	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	12	13-14	GNA	est 1:30PM-2:30PM
4.W.12	West	Gash	12	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	11	9-10, 11-13	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	11	13-14	GNA	est 1:30PM-2:30PM
4.W.12	West	Gash	11	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	10	9-10, 11-12	GNA	est 1:30PM-2:30PM
4.W.12	West	Gash	10	13-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	9	10-13	GNA	est 1:30PM-2:30PM
4.W.12	West	Gash	9	13-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	8	6-7, 8-9, 10-12	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	8	12-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Smoke	7	2-3, 5-8?	GNA	est 1:30PM-2:30PM
4.W.12	West	Burned-out?	7	8-9	GNA	est 1:30PM-2:30PM
4.W.12	West	Broken Window	7	9-13	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	7	13-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage / Broken Window	6	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage	4	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage	3	14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage	2	9-12, 14-15	GNA	est 1:30PM-2:30PM
4.W.12	West	Debris Damage	1	9-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage / Broken Window	10	12-14	GNA	est 1:30PM-2:30PM
4.W.13	West	Broken Window	9	10-12	GNA	est 1:30PM-2:30PM
4.W.13	West	Broken Window	8	8-9, 10-12	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage / Broken Window	8	12-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Smoke	7	4-6	GNA	est 1:30PM-2:30PM
4.W.13	West	Burned-out	7	6-11	GNA	est 1:30PM-2:30PM
4.W.13	West	Broken Window	7	11-13	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage / Broken Window	7	13-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage / Broken Window	6	14-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	5	14-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	4	5-9	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	4	14-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	3	3-9	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	3	14-15	GNA	est 1:30PM-2:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.13	West	Debris Damage	2	9-12, 14-15	GNA	est 1:30PM-2:30PM
4.W.13	West	Debris Damage	1	9-15	GNA	est 1:30PM-2:30PM
4.W.14	West	Debris Damage / Broken Window	46	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	45	13-14	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	45	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	44	11-12, 13-14	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	44	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage	43	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	42	14-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	41	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	40	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	38	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Burned-out	30	12-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Burned-out	29	11-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	25	13-14	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage	25	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	24	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	23	13-14	GNA	est 1:00PM-2:00PM
4.W.14	West	Burned-out	22	13-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Broken Window	21	14-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Burned-out	19	14-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Smoke	18	14-15	GNA	est 1:00PM-2:00PM
4.W.14	West	Debris Damage / Broken Window	17	14A-15	GNA	est 1:00PM-2:00PM
4.W.15	West	Broken Window	28	9-10	GNA	est 1:30PM-2:00PM
4.W.15	West	Broken Window	25	13-14	GNA	est 1:30PM-2:00PM
4.W.15	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.15	West	Broken Window	24	14A-15	GNA	est 1:30PM-2:00PM
4.W.15	West	Broken Window	23	12-14	GNA	est 1:30PM-2:00PM
4.W.15	West	Smoke	22	13-15	GNA	est 1:30PM-2:00PM
4.W.15	West	Broken Window	21	13-15	GNA	est 1:30PM-2:00PM
4.W.15	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:30PM-2:00PM
4.W.15	West	Broken Window	19	13-14	GNA	est 1:30PM-2:00PM
4.W.15	West	Burned-out	19	14-15	GNA	est 1:30PM-2:00PM
4.W.15	South	Debris Damage	25	15-16	GNA	est 1:30PM-2:00PM
4.W.15	South	Debris Damage	19	15-16	GNA	est 1:30PM-2:00PM
4.W.16	West	Burned-out	30	14-15	GNA	est 1:30PM-2:00PM
4.W.16	West	Burned-out	29	14A-15	GNA	est 1:30PM-2:00PM
4.W.16	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.16	West	Burned-out	22	14A-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Burned-out	22	14-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Broken Window	21	14-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Burned-out	19	14A-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Smoke	18	14A-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Debris Damage / Broken Window	17	14A-15	GNA	est 1:30PM-2:00PM
4.W.17	West	Debris Damage / Broken Window	16	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Debris Damage / Broken Window	46	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Broken Window	45	13-14	GNA	est 1:30PM-2:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.18	West	Debris Damage / Broken Window	45	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Broken Window	44	11-12, 13-14	GNA	est 1:30PM-2:00PM
4.W.18	West	Debris Damage / Broken Window	44	14-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Debris Damage	43	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Debris Damage / Broken Window	42	14-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Debris Damage / Broken Window	41	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Broken Window	40	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Broken Window	38	14A-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Burned-out	30	14-15	GNA	est 1:30PM-2:00PM
4.W.18	West	Burned-out	29	14A-15	GNA	est 1:30PM-2:00PM
4.W.19	West	Burned-out	29	14A-15	GNA	est 1:30PM-2:00PM
4.W.19	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Broken Window	24	14A-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Broken Window	23	13-14	GNA	est 1:30PM-2:00PM
4.W.20	West	Smoke	22	13-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Broken Window	21	13-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Debris Damage / Broken Window	20	14A-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Burned-out	19	14-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Smoke	18	14-15	GNA	est 1:30PM-2:00PM
4.W.20	West	Smoke Obscures	17	14-15	GNA	est 1:30PM-2:00PM
4.W.21	West	Broken Window	21	14-15	NIST	shortly after 1:30PM
4.W.21	West	Debris Damage / Broken Window	20	14A-15	NIST	shortly after 1:30PM
4.W.21	West	Burned-out	19	14-15	NIST	shortly after 1:30PM
4.W.21	West	Smoke	18	14-15	NIST	shortly after 1:30PM
4.W.21	West	Smoke	17	14A-15	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	21	15-16	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	20	15-16	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	15	24-26	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	14	22-26	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	13	22-26	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	12	19-21	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	12	21-26	NIST	shortly after 1:30PM
4.W.21	South	Gash	11	18-19	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	11	19-21	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	11	21-25	NIST	shortly after 1:30PM
4.W.21	South	Gash	10	15-19	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	10	19-21, 22-23	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	10	21-22, 23-25	NIST	shortly after 1:30PM
4.W.21	South	Gash	9	15-19	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	9	19-22	NIST	shortly after 1:30PM
4.W.21	South	Broken Window	9	22-24	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	8	15-16, 19-20	NIST	shortly after 1:30PM
4.W.21	South	Gash	8	16-19	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	7	15-16	NIST	shortly after 1:30PM
4.W.21	South	Gash	7	16-18	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	6	15-16	NIST	shortly after 1:30PM
4.W.21	South	Debris Damage / Broken Window	5	15-16	NIST	shortly after 1:30PM
4.W.21	South	Smoke Obscures	11+	15-18	NIST	shortly after 1:30PM
4.W.22	West	Burned-out	30	12-15	NIST	shortly after 1:30PM
4.W.22	West	Burned-out	29	12-15	NIST	shortly after 1:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.22	West	Debris Damage	25	14A-15	NIST	shortly after 1:30PM
4.W.22	West	Broken Window	24	14A-15	NIST	shortly after 1:30PM
4.W.22	West	Smoke	22	14-15	NIST	shortly after 1:30PM
4.W.22	West	Broken Window	21	14-15	NIST	shortly after 1:30PM
4.W.22	West	Debris Damage	20	14A-15	NIST	shortly after 1:30PM
4.W.22	West	Burned-out	19	14A-15	NIST	shortly after 1:30PM
4.W.22	South	Debris Damage / Broken Window	8?	19-20?	NIST	shortly after 1:30PM
4.W.22	South	Debris Damage / Broken Window	7?	19-20?	NIST	shortly after 1:30PM
4.W.22	South	Debris Damage / Broken Window	6?	19-20?	NIST	shortly after 1:30PM
4.W.22	South	Debris Damage / Broken Window	5?	19-20?	NIST	shortly after 1:30PM
4.W.23	West	Broken Window	45	13-14	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage / Broken Window	45	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage / Broken Window	44	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage / Broken Window	43	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage / Broken Window	42	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage / Broken Window	41	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	40	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	38	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	31	5-6	GNA	est 1:30PM-2:00PM
4.W.23	West	Burned-out	30	12-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Burned-out	29	11-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	28	9-10	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	25	13-14	GNA	est 1:30PM-2:00PM
4.W.23	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	24	14A-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	23	12-14	GNA	est 1:30PM-2:00PM
4.W.23	West	Burned-out	22	13-15	GNA	est 1:30PM-2:00PM
4.W.23	West	Broken Window	21	14-15	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage / Broken Window	45	15-16	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage / Broken Window	44	15-16	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage / Broken Window	43	15-16	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage / Broken Window	42	15-16	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage / Broken Window	41	15-16	GNA	est 1:30PM-2:00PM
4.W.23	South	Debris Damage	25	15-16	GNA	est 1:30PM-2:00PM
4.W.24	West	Burned-out	30	13-15	GNA	est 1:30PM-2:00PM
4.W.24	West	Burned-out	29	13-15	GNA	est 1:30PM-2:00PM
4.W.24	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.24	West	Broken Window	24	14A-15	GNA	est 1:30PM-2:00PM
4.W.24	West	Burned-out	22	14A-15	GNA	est 1:30PM-2:00PM
4.W.24	West	Debris Damage	20	14A-15	GNA	est 1:30PM-2:00PM
4.W.25	West	Burned-out	30	14A-15	GNA	est 1:00PM-2:00PM
4.W.25	West	Burned-out	29	14A-15	GNA	est 1:00PM-2:00PM
4.W.25	West	Debris Damage	25	14A-15	GNA	est 1:00PM-2:00PM
4.W.26	West	Burned-out	30	14-15	GNA	est 1:00PM-2:00PM
4.W.26	West	Burned-out	29	14-15	GNA	est 1:00PM-2:00PM
4.W.26	West	Debris Damage	25	14A-15	GNA	est 1:00PM-2:00PM
4.W.27	West	Debris Damage / Broken Window	46	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Broken Window	45	13-14	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage / Broken Window	45	14A-15	GNA	est 1:30PM-2:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
4.W.27	West	Broken Window	44	11-12, 13-14	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage / Broken Window	44	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage	43	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage / Broken Window	42	14-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Broken Window	41	11-12	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage / Broken Window	41	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Broken Window	40	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Broken Window	38	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Burned-out	30	14-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Burned-out	29	14-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Debris Damage	25	14A-15	GNA	est 1:30PM-2:00PM
4.W.27	West	Burned-out	22	14A-15	GNA	est 1:30PM-2:00PM
5.E.01	East	Smoke	12?	?	GNA	est 2:00PM-2:28PM
5.E.01	North	Broken Window	8	42-43	GNA	est 2:00PM-2:28PM
5.E.02	East	Burned-out	12	29-30	GNA	est 2:00PM-2:08PM
5.E.02	East	Internal Fire / Broken Window	12	31-33	GNA	est 2:00PM-2:08PM
5.E.02	East	Smoke	12	33-34, 35-36	GNA	est 2:00PM-2:08PM
5.E.02	East	External Fire / Broken Window	12	34-35	GNA	est 2:00PM-2:08PM
5.E.02	East	Burned-out	11	29-31	GNA	est 2:00PM-2:08PM
5.E.03	East	Burned-out	11	29-31	GNA	est 2:00PM-2:08PM
5.E.03	North	Broken Window	8	42-43	GNA	est 2:00PM-2:08PM
5.E.04	East	Burned-out	12	31-35?	GNA	est 2:00PM-2:08PM
5.E.04	East	Smoke	12	35-36?	GNA	est 2:00PM-2:08PM
5.E.04	East	Burned-out	11	29-30	GNA	est 2:00PM-2:08PM
5.E.04	East	Internal Fire / Broken Window	11	30-31	GNA	est 2:00PM-2:08PM
5.E.04	North	Broken Window	8	42-43	GNA	est 2:00PM-2:08PM
5.E.05	East	Smoke	12	29-31, 35-36	GNA	est 2:00PM-2:08PM
5.E.05	East	Internal Fire / Broken Window	12	31-32	GNA	est 2:00PM-2:08PM
5.E.05	East	External Fire / Broken Window	12	32-35	GNA	est 2:00PM-2:08PM
5.E.05	East	Internal Fire / Broken Window	11	29-31	GNA	est 2:00PM-2:08PM
5.E.05	East	Broken Window	8	36-37	GNA	est 2:00PM-2:08PM
5.E.05	East	Smoke Obscures	13+	28-37	GNA	est 2:00PM-2:08PM
5.E.05	North	Broken Window	8	42-43	GNA	est 2:00PM-2:08PM
5.E.06	East	Smoke	12	35-36	GNA	est 2:00PM-2:08PM
5.E.06	East	Internal Fire / Broken Window	12	29-32	GNA	est 2:00PM-2:08PM
5.E.06	East	External Fire / Broken Window	12	32-35	GNA	est 2:00PM-2:08PM
5.E.06	East	Internal Fire / Broken Window	11	29-31	GNA	est 2:00PM-2:08PM
5.E.06	East	Broken Window	8	36-37	GNA	est 2:00PM-2:08PM
5.E.06	East	Smoke Obscures	13+	28-38	GNA	est 2:00PM-2:08PM
5.E.06	North	Broken Window	8	42-43	GNA	est 2:00PM-2:08PM
5.E.07	East	Internal Fire / Broken Window	12	29-30	GNA	est 2:00PM-2:08PM
5.E.07	East	External Fire / Broken Window	12	30-36	GNA	est 2:00PM-2:08PM
5.E.07	East	Internal Fire / Broken Window	11	29-31	GNA	est 2:00PM-2:08PM
5.E.07	East	Broken Window	8	36-37	GNA	est 2:00PM-2:08PM
5.E.07	East	Smoke Obscures	13+	29-37	GNA	est 2:00PM-2:08PM
5.E.07	North	Broken Window	8	42-43	GNA	est 2:00PM-2:08PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.08	East	External Fire / Broken Window	12	29-30, 31-34	FILE	2:08:28PM +/-1s
5.E.08	East	Smoke	12	30-31, 34-36	FILE	2:08:28PM +/-1s
5.E.08	East	Internal Fire / Broken Window	12	36-37	FILE	2:08:28PM +/-1s
5.E.08	East	Internal Fire / Broken Window	11	29-31	FILE	2:08:28PM +/-1s
5.E.08	North	Broken Window	8	42-43	FILE	2:08:28PM +/-1s
5.E.09	East	Burned-out	12	29-31	FILE	2:08:45PM +/-1s
5.E.09	East	External Fire / Broken Window	12	31-35	FILE	2:08:45PM +/-1s
5.E.09	East	Smoke	12	35-37	FILE	2:08:45PM +/-1s
5.E.09	East	Burned-out	11	29-30	FILE	2:08:45PM +/-1s
5.E.09	East	Internal Fire / Broken Window	11	30-31	FILE	2:08:45PM +/-1s
5.E.09	East	Broken Window	8	36-37	FILE	2:08:45PM +/-1s
5.E.09	East	Smoke Obscures	13+	28-37	FILE	2:08:45PM +/-1s
5.E.09	North	Broken Window	8	42-43	FILE	2:08:45PM +/-1s
5.E.10	East	Internal Fire / Broken Window	12	29-31, 35-36	FILE	2:09:54PM +/-1s
5.E.10	East	External Fire / Broken Window	12	31-35	FILE	2:09:54PM +/-1s
5.E.10	East	Internal Fire / Broken Window	11	29-31	FILE	2:09:54PM +/-1s
5.E.10	East	Broken Window	8	36-37	FILE	2:09:54PM +/-1s
5.E.10	East	Smoke Obscures	13+	30-39	FILE	2:09:54PM +/-1s
5.E.10	North	Broken Window	8	42-43	FILE	2:09:54PM +/-1s
5.E.11	East	Internal Fire / Broken Window	12	29-31	FILE	2:10:56PM +/-1s
5.E.11	East	External Fire / Broken Window	12	31-35	FILE	2:10:56PM +/-1s
5.E.11	East	Smoke	12	35-36	FILE	2:10:56PM +/-1s
5.E.11	East	Internal Fire / Broken Window	11	29-31	FILE	2:10:56PM +/-1s
5.E.11	East	Broken Window	8	36-37	FILE	2:10:56PM +/-1s
5.E.11	East	Smoke Obscures	13+	29-37	FILE	2:10:56PM +/-1s
5.E.12	East	External Fire / Broken Window	12	29-35	FILE	2:11:09PM +/-1s
5.E.12	East	Smoke	12	35-37	FILE	2:11:09PM +/-1s
5.E.12	East	Internal Fire / Broken Window	11	29-30	FILE	2:11:09PM +/-1s
5.E.12	East	Burned-out	11	30-31	FILE	2:11:09PM +/-1s
5.E.12	East	Broken Window	8	36-37	FILE	2:11:09PM +/-1s
5.E.12	East	Smoke Obscures	13+	29-37	FILE	2:11:09PM +/-1s
5.E.12	North	Broken Window	8	42-43	FILE	2:11:09PM +/-1s
5.E.13	East	External Fire / Broken Window	12	29-35	FILE	2:11:19PM +/-1s
5.E.13	East	Smoke	12	35-37	FILE	2:11:19PM +/-1s
5.E.13	East	Internal Fire / Broken Window	11	29-31	FILE	2:11:19PM +/-1s
5.E.13	East	Broken Window	8	36-37	FILE	2:11:19PM +/-1s
5.E.13	East	Smoke Obscures	13+	28-37	FILE	2:11:19PM +/-1s
5.E.13	North	Broken Window	8	42-43	FILE	2:11:19PM +/-1s
5.E.14	East	Internal Fire / Broken Window	12	29-31	FILE	2:11:26PM +/-1s
5.E.14	East	External Fire / Broken Window	12	31-35	FILE	2:11:26PM +/-1s
5.E.14	East	Smoke	12	35-37	FILE	2:11:26PM +/-1s
5.E.14	East	Internal Fire / Broken Window	11	29-31	FILE	2:11:26PM +/-1s
5.E.14	East	Broken Window	8	36-37	FILE	2:11:26PM +/-1s
5.E.14	East	Smoke Obscures	13+	29-38	FILE	2:11:26PM +/-1s
5.E.15	East	Internal Fire / Broken Window	12	29-30	FILE	2:12:57PM +/-1s
5.E.15	East	External Fire / Broken Window	12	30-36	FILE	2:12:57PM +/-1s
5.E.15	East	Burned-out	12	36-37	FILE	2:12:57PM +/-1s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.15	East	Burned-out	11	29-30	FILE	2:12:57PM +/-1s
5.E.15	East	Internal Fire / Broken Window	11	30-31	FILE	2:12:57PM +/-1s
5.E.15	East	Smoke Obscures	13+	29-37	FILE	2:12:57PM +/-1s
5.E.16	East	Internal Fire / Broken Window	12	29-30, 35-36	GNA	est 2:08PM-2:13PM
5.E.16	East	External Fire / Broken Window	12	30-35	GNA	est 2:08PM-2:13PM
5.E.16	East	Smoke	12	36-37	GNA	est 2:08PM-2:13PM
5.E.16	East	Internal Fire / Broken Window	11	29-31	GNA	est 2:08PM-2:13PM
5.E.16	East	Broken Window	8	36-37	GNA	est 2:08PM-2:13PM
5.E.16	East	Smoke Obscures	13+	29-37	GNA	est 2:08PM-2:13PM
5.E.16	North	Broken Window	8	42-43	GNA	est 2:08PM-2:13PM
5.E.17	East	Internal Fire / Broken Window	12	29-31	FILE	2:13:04PM +/-1s
5.E.17	East	External Fire / Broken Window	12	31-36	FILE	2:13:04PM +/-1s
5.E.17	East	Smoke	12	36-37	FILE	2:13:04PM +/-1s
5.E.17	East	Burned-out	11	29-31	FILE	2:13:04PM +/-1s
5.E.17	East	Broken Window	8	36-37	FILE	2:13:04PM +/-1s
5.E.17	East	Smoke	5	37-38	FILE	2:13:04PM +/-1s
5.E.17	East	Smoke Obscures	13+	29-38	FILE	2:13:04PM +/-1s
5.E.17	North	Broken Window	8	42-43	FILE	2:13:04PM +/-1s
5.E.18	East	External Fire / Broken Window	12	30-35	GNA	est 2:08PM-2:28PM
5.E.18	East	Internal Fire / Broken Window	12	35-36	GNA	est 2:08PM-2:28PM
5.E.18	East	Smoke	12	36-37	GNA	est 2:08PM-2:28PM
5.E.18	East	Burned-out	11	29-31	GNA	est 2:08PM-2:28PM
5.E.18	East	Smoke Obscures	13+	28-39	GNA	est 2:08PM-2:28PM
5.E.18	North	Broken Window	8	42-43	GNA	est 2:08PM-2:28PM
5.E.19	East	Internal Fire / Broken Window	12	29-30	GNA	est 2:08PM-2:28PM
5.E.19	East	External Fire / Broken Window	12	30-36	GNA	est 2:08PM-2:28PM
5.E.19	East	Burned-out	11	29-31	GNA	est 2:08PM-2:28PM
5.E.19	East	Smoke Obscures	13+	28-42	GNA	est 2:08PM-2:28PM
5.E.19	North	Broken Window	8	42-43	GNA	est 2:08PM-2:28PM
5.E.20	East	Internal Fire / Broken Window	12	28-30	GNA	est 2:13PM-2:27PM
5.E.20	East	External Fire / Broken Window	12	30-36	GNA	est 2:13PM-2:27PM
5.E.20	East	Smoke	12	36-37	GNA	est 2:13PM-2:27PM
5.E.20	East	Internal Fire / Broken Window	11	29-30	GNA	est 2:13PM-2:27PM
5.E.20	East	Burned-out	11	30-31	GNA	est 2:13PM-2:27PM
5.E.20	East	Broken Window	8	36-37	GNA	est 2:13PM-2:27PM
5.E.20	East	Smoke Obscures	13+	29-38	GNA	est 2:13PM-2:27PM
5.E.20	North	Broken Window	8	42-43	GNA	est 2:13PM-2:27PM
5.E.21	East	Smoke	12	28-29, 36-37	FILE	2:14:09PM +/-1s
5.E.21	East	External Fire / Broken Window	12	29-36	FILE	2:14:09PM +/-1s
5.E.21	East	Burned-out	11	29-31	FILE	2:14:09PM +/-1s
5.E.21	East	Broken Window	8	36-37	FILE	2:14:09PM +/-1s
5.E.21	East	Smoke Obscures	13+	28-39	FILE	2:14:09PM +/-1s
5.E.21	North	Broken Window	8	42-43	FILE	2:14:09PM +/-1s
5.E.22	East	Internal Fire / Broken Window	12	28-31	FILE	2:14:29PM +/-1s
5.E.22	East	External Fire / Broken Window	12	31-36	FILE	2:14:29PM +/-1s
5.E.22	East	Smoke	12	36-37	FILE	2:14:29PM +/-1s
5.E.22	East	Burned-out	11	29-31	FILE	2:14:29PM +/-1s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.22	East	Broken Window	8	36-37	FILE	2:14:29PM +/-1s
5.E.22	East	Smoke Obscures	13+	29-38	FILE	2:14:29PM +/-1s
5.E.23	East	Smoke	12	28-31, 36-37	FILE	2:14:33PM +/-1s
5.E.23	East	External Fire / Broken Window	12	31-35	FILE	2:14:33PM +/-1s
5.E.23	East	Internal Fire / Broken Window	12	35-36	FILE	2:14:33PM +/-1s
5.E.23	East	Burned-out	11	29-31	FILE	2:14:33PM +/-1s
5.E.23	East	Broken Window	8	36-37	FILE	2:14:33PM +/-1s
5.E.23	East	Smoke Obscures	13+	28-38	FILE	2:14:33PM +/-1s
5.E.24	East	Internal Fire / Broken Window	12	28-30	GNA	est 2:13PM-2:28PM
5.E.24	East	Burned-out	11	29-31	GNA	est 2:13PM-2:28PM
5.E.24	East	Broken Window	8	36-37	GNA	est 2:13PM-2:28PM
5.E.25	East	Internal Fire / Broken Window	12	28-31	GNA	est 2:13PM-2:27PM
5.E.25	East	External Fire / Broken Window	12	31-37	GNA	est 2:13PM-2:27PM
5.E.25	East	Burned-out	11	29-31	GNA	est 2:13PM-2:27PM
5.E.25	East	Broken Window	8	36-37	GNA	est 2:13PM-2:27PM
5.E.25	East	Smoke Obscures	13+	29-38	GNA	est 2:13PM-2:27PM
5.E.25	North	Broken Window	8	42-43	GNA	est 2:13PM-2:27PM
5.E.26	East	External Fire / Broken Window	12	28-36	GNA	est 2:13PM-2:27PM
5.E.26	East	Smoke	12	36-37	GNA	est 2:13PM-2:27PM
5.E.26	East	Internal Fire / Broken Window	11	29-31	GNA	est 2:13PM-2:27PM
5.E.26	East	Broken Window	8	36-37	GNA	est 2:13PM-2:27PM
5.E.26	East	Smoke Obscures	13+	28-38	GNA	est 2:13PM-2:27PM
5.E.26	North	Broken Window	8	42-43	GNA	est 2:13PM-2:27PM
5.E.27	East	Smoke	12	28-29, 35-38	NIST	2:15PM-2:27PM
5.E.27	East	Internal Fire / Broken Window	12	29-30	NIST	2:15PM-2:27PM
5.E.27	East	External Fire / Broken Window	12	30-35	NIST	2:15PM-2:27PM
5.E.27	East	Burned-out	11	29-31	NIST	2:15PM-2:27PM
5.E.27	East	Smoke Obscures	13+	28-36	NIST	2:15PM-2:27PM
5.E.28	East	Smoke	12	28-29, 36-38	GNA	est 2:15PM-2:28PM
5.E.28	East	External Fire / Broken Window	12	29-36	GNA	est 2:15PM-2:28PM
5.E.28	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.28	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.28	East	Smoke Obscures	13+	28-42	GNA	est 2:15PM-2:28PM
5.E.28	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.29	East	Smoke	12	28-29, 36-38	GNA	est 2:15PM-2:28PM
5.E.29	East	External Fire / Broken Window	12	29-36	GNA	est 2:15PM-2:28PM
5.E.29	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.29	East	Smoke Obscures	13+	28-40	GNA	est 2:15PM-2:28PM
5.E.29	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.30	East	Internal Fire / Broken Window	12	28-29, 32-33	GNA	est 2:15PM-2:28PM
5.E.30	East	External Fire / Broken Window	12	29-32, 33-36	GNA	est 2:15PM-2:28PM
5.E.30	East	Smoke	12	36-38	GNA	est 2:15PM-2:28PM
5.E.30	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.30	East	Internal Fire / Broken Window	11	32-33	GNA	est 2:15PM-2:28PM
5.E.30	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.30	East	Smoke Obscures	13+	28-38	GNA	est 2:15PM-2:28PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.30	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.31	East	Internal Fire / Broken Window	12	28-29	GNA	est 2:15PM-2:28PM
5.E.31	East	Smoke	12	29-30, 36-38	GNA	est 2:15PM-2:28PM
5.E.31	East	External Fire / Broken Window	12	30-36	GNA	est 2:15PM-2:28PM
5.E.31	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.31	East	Internal Fire / Broken Window	11	32-33	GNA	est 2:15PM-2:28PM
5.E.31	East	Broken Window	11	33-34	GNA	est 2:15PM-2:28PM
5.E.32	East	Internal Fire / Broken Window	12	28-32	GNA	est 2:15PM-2:28PM
5.E.32	East	External Fire / Broken Window	12	32-36	GNA	est 2:15PM-2:28PM
5.E.32	East	Smoke	12	36-38	GNA	est 2:15PM-2:28PM
5.E.32	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.32	East	Internal Fire / Broken Window	11	31-34	GNA	est 2:15PM-2:28PM
5.E.33	East	Internal Fire / Broken Window	12	28-31, 33-34	GNA	est 2:15PM-2:28PM
5.E.33	East	Internal Fire / Broken Window	12	36-37	GNA	est 2:15PM-2:28PM
5.E.33	East	External Fire / Broken Window	12	31-33, 34-36	GNA	est 2:15PM-2:28PM
5.E.33	East	Smoke	12	37-38	GNA	est 2:15PM-2:28PM
5.E.33	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.33	East	Internal Fire / Broken Window	11	31-34	GNA	est 2:15PM-2:28PM
5.E.33	East	External Fire / Broken Window	11	34-35	GNA	est 2:15PM-2:28PM
5.E.33	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.33	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.33	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.34	East	Internal Fire / Broken Window	12	28-30, 33-34	GNA	est 2:15PM-2:28PM
5.E.34	East	Internal Fire / Broken Window	12	36-37	GNA	est 2:15PM-2:28PM
5.E.34	East	External Fire / Broken Window	12	30-33, 34-36	GNA	est 2:15PM-2:28PM
5.E.34	East	Smoke	12	37-38	GNA	est 2:15PM-2:28PM
5.E.34	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.34	East	Internal Fire / Broken Window	11	31-34	GNA	est 2:15PM-2:28PM
5.E.34	East	External Fire / Broken Window	11	34-35	GNA	est 2:15PM-2:28PM
5.E.34	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.34	East	Smoke Obscures	13+	28-37	GNA	est 2:15PM-2:28PM
5.E.34	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.35	East	Smoke	12	28-29, 36-38	GNA	est 2:15PM-2:28PM
5.E.35	East	Internal Fire / Broken Window	12	29-30, 33-34	GNA	est 2:15PM-2:28PM
5.E.35	East	External Fire / Broken Window	12	30-33, 34-36	GNA	est 2:15PM-2:28PM
5.E.35	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.35	East	Internal Fire / Broken Window	11	31-35	GNA	est 2:15PM-2:28PM
5.E.35	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.35	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.35	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.36	East	Smoke	12	28-29, 36-38	GNA	est 2:15PM-2:28PM
5.E.36	East	Internal Fire / Broken Window	12	29-31, 32-33	GNA	est 2:15PM-2:28PM
5.E.36	East	External Fire / Broken Window	12	31-32, 33-36	GNA	est 2:15PM-2:28PM
5.E.36	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.36	East	Internal Fire / Broken Window	11	31-35	GNA	est 2:15PM-2:28PM
5.E.36	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.36	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.36	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.37	East	Smoke	12	28-29, 37-38	GNA	est 2:15PM-2:28PM
5.E.37	East	Internal Fire / Broken Window	12	29-30, 32-35	GNA	est 2:15PM-2:28PM
5.E.37	East	Internal Fire / Broken Window	12	36-37	GNA	est 2:15PM-2:28PM
5.E.37	East	External Fire / Broken Window	12	30-32, 35-36	GNA	est 2:15PM-2:28PM
5.E.37	East	Burned-out	11	29-31, 34-35	GNA	est 2:15PM-2:28PM
5.E.37	East	Internal Fire / Broken Window	11	31-34	GNA	est 2:15PM-2:28PM
5.E.37	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.37	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.37	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.38	East	Internal Fire / Broken Window	12	28-30, 32-33	GNA	est 2:15PM-2:28PM
5.E.38	East	Internal Fire / Broken Window	12	34-36	GNA	est 2:15PM-2:28PM
5.E.38	East	External Fire / Broken Window	12	30-31, 33-34	GNA	est 2:15PM-2:28PM
5.E.38	East	Smoke	12	31-32, 36-38	GNA	est 2:15PM-2:28PM
5.E.38	East	Burned-out	11	29-30	GNA	est 2:15PM-2:28PM
5.E.38	East	Smoke?	11	30-31	GNA	est 2:15PM-2:28PM
5.E.38	East	Internal Fire / Broken Window	11	31-35	GNA	est 2:15PM-2:28PM
5.E.38	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.38	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.38	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.39	East	Internal Fire / Broken Window	12	28-31, 33-36	GNA	est 2:15PM-2:28PM
5.E.39	East	Smoke Obscures	12	31-33	GNA	est 2:15PM-2:28PM
5.E.39	East	Smoke	12	36-38	GNA	est 2:15PM-2:28PM
5.E.39	East	Burned-out	11	29-30	GNA	est 2:15PM-2:28PM
5.E.39	East	Smoke	11	30-31	GNA	est 2:15PM-2:28PM
5.E.39	East	Internal Fire / Broken Window	11	31-35	GNA	est 2:15PM-2:28PM
5.E.39	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.39	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.39	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.40	East	Internal Fire / Broken Window	12	28-30, 35-36	GNA	est 2:15PM-2:28PM
5.E.40	East	Smoke Obscures	12	30-35	GNA	est 2:15PM-2:28PM
5.E.40	East	Smoke	12	36-38	GNA	est 2:15PM-2:28PM
5.E.40	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.40	East	Internal Fire / Broken Window	11	31-32, 33-35	GNA	est 2:15PM-2:28PM
5.E.40	East	External Fire / Broken Window	11	32-33	GNA	est 2:15PM-2:28PM
5.E.40	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.40	East	Smoke Obscures	13+	28-37	GNA	est 2:15PM-2:28PM
5.E.40	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.41	East	Internal Fire / Broken Window	12	28-29, 30-34	GNA	est 2:15PM-2:28PM
5.E.41	East	External Fire / Broken Window	12	29-30, 34-37	GNA	est 2:15PM-2:28PM
5.E.41	East	Smoke	12	37-38	GNA	est 2:15PM-2:28PM
5.E.41	East	Internal Fire / Broken Window	11	29-30, 31-34	GNA	est 2:15PM-2:28PM
5.E.41	East	Burned-out	11	30-31	GNA	est 2:15PM-2:28PM
5.E.41	East	External Fire / Broken Window	11	34-35	GNA	est 2:15PM-2:28PM
5.E.41	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.41	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.41	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.42	East	Internal Fire / Broken Window	12	28-31, 32-34	GNA	est 2:15PM-2:28PM
5.E.42	East	External Fire / Broken Window	12	31-32, 34-37	GNA	est 2:15PM-2:28PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.42	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.42	East	Internal Fire / Broken Window	11	31-35	GNA	est 2:15PM-2:28PM
5.E.42	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.42	East	Smoke Obscures	13+	28-40	GNA	est 2:15PM-2:28PM
5.E.42	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.43	East	Internal Fire / Broken Window	12	28-32, 34-37	GNA	est 2:15PM-2:28PM
5.E.43	East	Smoke	12	32-34	GNA	est 2:15PM-2:28PM
5.E.43	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.43	East	Internal Fire / Broken Window	11	31-33	GNA	est 2:15PM-2:28PM
5.E.43	East	External Fire / Broken Window	11	33-35	GNA	est 2:15PM-2:28PM
5.E.43	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.43	East	Smoke Obscures	13+	28-38	GNA	est 2:15PM-2:28PM
5.E.43	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.44	East	Internal Fire / Broken Window	12	28-29, 30-34	GNA	est 2:15PM-2:28PM
5.E.44	East	External Fire / Broken Window	12	29-30, 34-35	GNA	est 2:15PM-2:28PM
5.E.44	East	Burned-out	11	29-32	GNA	est 2:15PM-2:28PM
5.E.44	East	Internal Fire / Broken Window	11	32-35	GNA	est 2:15PM-2:28PM
5.E.44	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.44	East	Smoke Obscures	13+	28-41	GNA	est 2:15PM-2:28PM
5.E.44	East	Smoke Obscures	12	35-39	GNA	est 2:15PM-2:28PM
5.E.44	East	Smoke Obscures	11	35-39	GNA	est 2:15PM-2:28PM
5.E.44	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.45	East	Internal Fire / Broken Window	12	28-31, 33-35	GNA	est 2:15PM-2:28PM
5.E.45	East	Smoke Obscures	12	31-33, 35-38	GNA	est 2:15PM-2:28PM
5.E.45	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.45	East	Internal Fire / Broken Window	11	31-33	GNA	est 2:15PM-2:28PM
5.E.45	East	External Fire / Broken Window	11	33-34	GNA	est 2:15PM-2:28PM
5.E.45	East	Smoke	11	34-35	GNA	est 2:15PM-2:28PM
5.E.45	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.45	East	Smoke Obscures	13+	28-38	GNA	est 2:15PM-2:28PM
5.E.45	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.46	East	External Fire / Broken Window	11?	?	GNA	est 2:00PM-3:00PM
5.E.47	East	Burned-out	12	28-29	GNA	est 2:15PM-2:28PM
5.E.47	East	Internal Fire / Broken Window	12	29-34	GNA	est 2:15PM-2:28PM
5.E.47	East	External Fire / Broken Window	12	34-36	GNA	est 2:15PM-2:28PM
5.E.47	East	Smoke	12	36-38	GNA	est 2:15PM-2:28PM
5.E.47	East	Burned-out	11	29-31	GNA	est 2:15PM-2:28PM
5.E.47	East	Internal Fire / Broken Window	11	31-32	GNA	est 2:15PM-2:28PM
5.E.47	East	Smoke	11	32-35	GNA	est 2:15PM-2:28PM
5.E.47	East	Smoke Obscures	15	28-40	GNA	est 2:15PM-2:28PM
5.E.47	East	Smoke Obscures	14	28-40	GNA	est 2:15PM-2:28PM
5.E.47	East	Smoke Obscures	13	28-40	GNA	est 2:15PM-2:28PM
5.E.47	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.48	East	Smoke	12	?	GNA	est 2:00PM-3:00PM
5.E.48	East	External Fire / Broken Window	12	?	GNA	est 2:00PM-3:00PM
5.E.48	East	Smoke	11	?	GNA	est 2:00PM-3:00PM
5.E.48	North	Broken Window	8	42-43	GNA	est 2:00PM-3:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.E.49	East	Internal Fire / Broken Window	12	28-29	GNA	est 2:15PM-2:28PM
5.E.49	East	Smoke	12	29-34, 37-38	GNA	est 2:15PM-2:28PM
5.E.49	East	External Fire / Broken Window	12	34-37	GNA	est 2:15PM-2:28PM
5.E.49	East	Internal Fire / Broken Window	11	29-30, 31-35	GNA	est 2:15PM-2:28PM
5.E.49	East	Burned-out	11	30-31	GNA	est 2:15PM-2:28PM
5.E.49	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.49	East	Smoke Obscures	13+	28-38	GNA	est 2:15PM-2:28PM
5.E.49	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.50	East	Internal Fire / Broken Window	12	28-29	GNA	est 2:15PM-2:28PM
5.E.50	East	Burned-out	12	29-34	GNA	est 2:15PM-2:28PM
5.E.50	East	External Fire / Broken Window	12	34-37	GNA	est 2:15PM-2:28PM
5.E.50	East	Smoke	12	37-38	GNA	est 2:15PM-2:28PM
5.E.50	East	Internal Fire / Broken Window	11	29-30, 31-35	GNA	est 2:15PM-2:28PM
5.E.50	East	Burned-out	11	30-31	GNA	est 2:15PM-2:28PM
5.E.50	East	Broken Window	8	36-37	GNA	est 2:15PM-2:28PM
5.E.50	East	Smoke Obscures	13+	28-39	GNA	est 2:15PM-2:28PM
5.E.50	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.51	East	Smoke	12	?	GNA	est 2:00PM-3:00PM
5.E.51	East	External Fire / Broken Window	12	?	GNA	est 2:00PM-3:00PM
5.E.52	East	External Fire / Broken Window	12	34-37	GNA	est 2:15PM-2:28PM
5.E.52	East	Smoke	12	37-38	GNA	est 2:15PM-2:28PM
5.E.52	East	Internal Fire / Broken Window	11	32-35	GNA	est 2:15PM-2:28PM
5.E.52	North	Broken Window	8	42-43	GNA	est 2:15PM-2:28PM
5.E.53	East	Internal Fire / Broken Window	12	28-30, 31-34	FILE	2:28:43PM +/-1s
5.E.53	East	Internal Fire / Broken Window	12	35-36	FILE	2:28:43PM +/-1s
5.E.53	East	External Fire / Broken Window	12	30-31, 34-35	FILE	2:28:43PM +/-1s
5.E.53	East	External Fire / Broken Window	12	36-37	FILE	2:28:43PM +/-1s
5.E.53	East	Smoke	12	37-38	FILE	2:28:43PM +/-1s
5.E.53	East	Burned-out	11	29-31	FILE	2:28:43PM +/-1s
5.E.53	East	Internal Fire / Broken Window	11	31-35	FILE	2:28:43PM +/-1s
5.E.53	East	Broken Window	11	35-36	FILE	2:28:43PM +/-1s
5.E.53	East	Broken Window	8	36-37	FILE	2:28:43PM +/-1s
5.E.53	East	Smoke Obscures	13+	28-39	FILE	2:28:43PM +/-1s
5.E.54	East	Broken Window	13	29-30	GNA	est 2:28PM-3:10PM
5.E.54	East	Smoke	13	31-32	GNA	est 2:28PM-3:10PM
5.E.54	East	External Fire / Broken Window	13	32-36	GNA	est 2:28PM-3:10PM
5.E.54	East	Internal Fire / Broken Window	12	28-29, 31-34	GNA	est 2:28PM-3:10PM
5.E.54	East	Burned-out	12	29-31	GNA	est 2:28PM-3:10PM
5.E.54	East	External Fire / Broken Window	12	34-38	GNA	est 2:28PM-3:10PM
5.E.54	East	Smoke	12	38-39	GNA	est 2:28PM-3:10PM
5.E.54	East	Burned-out	11	29-31	GNA	est 2:28PM-3:10PM
5.E.54	East	Internal Fire / Broken Window	11	31-33, 36-37	GNA	est 2:28PM-3:10PM
5.E.54	East	External Fire / Broken Window	11	33-36	GNA	est 2:28PM-3:10PM
5.E.54	East	Smoke Obscures	13+	36-40	GNA	est 2:28PM-3:10PM
5.N.01	North	Internal Fire / Broken Window	12	44-46	NIST	2:57PM +/-300s
5.N.01	North	Broken Window	8	42-43, 47-48	NIST	2:57PM +/-300s
5.N.01	North	Internal Fire / Broken Window	7	50-53, 54-55	NIST	2:57PM +/-300s
5.N.01	North	Broken Window	7	53-54	NIST	2:57PM +/-300s

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.W.01	West	Debris Damage	25	14A-15	GNA	est 2:00PM-3:00PM
5.W.01	West	Burned-out	22	14A-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Broken Window	38	14A-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Burned-out	30	13-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Burned-out	29	14-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Debris Damage	25	14A-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Broken Window	24	14A-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Burned-out	22	14A-15	GNA	est 2:00PM-3:00PM
5.W.02	West	Debris Damage	20	14A-15	GNA	est 2:00PM-3:00PM
5.W.03	West	Debris Damage	25	14A-15	GNA	est 2:00PM-3:00PM
5.W.03	West	Broken Window	24	14A-15	GNA	est 2:00PM-3:00PM
5.W.03	West	Burned-out	22	14A-15	GNA	est 2:00PM-3:00PM
5.W.03	West	Debris Damage	20	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Burned-out	30	11-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Burned-out	29	11-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Broken Window	25	13-14	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage	25	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Broken Window	24	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Broken Window	23	13-14	GNA	est 2:00PM-3:00PM
5.W.04	West	Burned-out	22	13-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Broken Window	21	13-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage / Broken Window	20	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Broken Window	19	13-14	GNA	est 2:00PM-3:00PM
5.W.04	West	Burned-out	19	14-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Smoke	18	13-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage / Broken Window	17	14-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage / Broken Window	16	14-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage	15	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage	14	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage	13	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Gash	12	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Gash	11	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Gash	10	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Gash	9	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage / Broken Window	8	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	West	Debris Damage / Broken Window	7	14A-15	GNA	est 2:00PM-3:00PM
5.W.04	South	Burned-out	31	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Burned-out	30	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Burned-out	29	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage	25	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Burned-out	23	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Burned-out	22	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage	17	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage	16	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage	15	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage	14	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Smoke Obscures	13	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	12	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	11	15-17	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	10	15-17	GNA	est 2:00PM-3:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.W.04	South	Gash	9	15-17	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage / Broken Window	8	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	8	16-17	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage / Broken Window	7	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	7	16-17	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage / Broken Window	6	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	6	16-17	GNA	est 2:00PM-3:00PM
5.W.04	South	Debris Damage / Broken Window	5	15-16	GNA	est 2:00PM-3:00PM
5.W.04	South	Gash	5	16-17	GNA	est 2:00PM-3:00PM
5.W.05	West	Burned-out	30	11-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Burned-out	29	11-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Broken Window	25	13-14	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage	25	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Broken Window	24	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Broken Window	23	13-14	GNA	est 2:00PM-3:00PM
5.W.05	West	Burned-out	22	13-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Broken Window	21	13-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	20	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Broken Window	19	13-14	GNA	est 2:00PM-3:00PM
5.W.05	West	Burned-out	19	14-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Burned-out	18	13-14	GNA	est 2:00PM-3:00PM
5.W.05	West	Smoke	18	14-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	17	14-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	16	14-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	15	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	14	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	13	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Gash	12	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Gash	11	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Gash	10	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Gash	9	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	8	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	West	Debris Damage / Broken Window	7	14A-15	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	33	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	32	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	31	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	30	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	29	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage	25	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	23	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Burned-out	22	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage	14	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage	13	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	12	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	11	15-17	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	10	15-17	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	9	15-17	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage / Broken Window	8	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	8	16-17	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage / Broken Window	7	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	7	16-17	GNA	est 2:00PM-3:00PM
5.W.05	South	Debris Damage / Broken Window	6	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	6	16-17	GNA	est 2:00PM-3:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.W.05	South	Debris Damage / Broken Window	5	15-16	GNA	est 2:00PM-3:00PM
5.W.05	South	Gash	5	16-17	GNA	est 2:00PM-3:00PM
5.W.06	West	Burned-out	30	11-15	NIST	2:15PM-2:45PM
5.W.06	West	Burned-out	29	11-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	25	13-14	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage	25	14A-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	24	14A-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	23	12-14	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	22	3-4	NIST	2:15PM-2:45PM
5.W.06	West	Burned-out	22	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	21	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	20	8-9	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	19	8-9	NIST	2:15PM-2:45PM
5.W.06	West	Burned-out	19	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke	18	8-9	NIST	2:15PM-2:45PM
5.W.06	West	Burned-out	18	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	17	7-8	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	17	13-14	NIST	2:15PM-2:45PM
5.W.06	West	Burned-out?	17	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	16	13-14	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	16	14-14A	NIST	2:15PM-2:45PM
5.W.06	West	Gash	16	14A-15	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	15	13-14A	NIST	2:15PM-2:45PM
5.W.06	West	Gash	15	14A-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	14	2-3, 11-13	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	14	13-14A	NIST	2:15PM-2:45PM
5.W.06	West	Gash	14	14A-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	13	12-13	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	13	13-14	NIST	2:15PM-2:45PM
5.W.06	West	Gash	13	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	12	10-11, 12-13	NIST	2:15PM-2:45PM
5.W.06	West	Gash	12	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	11	2-9	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	11	9-10, 11-13	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	11	13-14	NIST	2:15PM-2:45PM
5.W.06	West	Gash	11	14-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	10	1-11	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	10	11-13	NIST	2:15PM-2:45PM
5.W.06	West	Gash	10	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	9	1-11	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	9	11-13	NIST	2:15PM-2:45PM
5.W.06	West	Gash	9	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	8	1-12	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	8	12-13	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	8	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	7	2-13	NIST	2:15PM-2:45PM
5.W.06	West	Debris Damage / Broken Window	7	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	6	2-13	NIST	2:15PM-2:45PM
5.W.06	West	Broken Window	6	13-15	NIST	2:15PM-2:45PM
5.W.06	West	Smoke Obscures	5	2-15	NIST	2:15PM-2:45PM
5.W.07	North	Burned-out	7	56-1	FILE	2:21:10PM
5.W.07	West	Debris Damage	8	12-15	FILE	2:21:10PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.W.07	West	Smoke	7	3-5	FILE	2:21:10PM
5.W.07	West	Debris Damage	7	13-15	FILE	2:21:10PM
5.W.07	West	Debris Damage	6	14-15	FILE	2:21:10PM
5.W.07	West	Debris Damage	5	14-15	FILE	2:21:10PM
5.W.08	West	Broken Window	21	14A-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Debris Damage	20	14A-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Broken Window	19	8-9, 12-14	GNA	est 2:00PM-3:30PM
5.W.08	West	Burned-out	19	14-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Broken Window	18	8-9, 13-14	GNA	est 2:00PM-3:30PM
5.W.08	West	Smoke?	18	14-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Broken Window	17	13-14	GNA	est 2:00PM-3:30PM
5.W.08	West	Smoke Obscures	17	14-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Broken Window	16	13-14	GNA	est 2:00PM-3:30PM
5.W.08	West	Broken Window	14	14-15	GNA	est 2:00PM-3:30PM
5.W.08	West	Debris Damage / Broken Window	13	13-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Burned-out	30	11-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Burned-out	29	11-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	28	9-10	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	25	13-14	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	24	14A-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	23	12-14	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	22	3-4	GNA	est 2:00PM-3:30PM
5.W.09	West	Burned-out	22	13-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	21	13-14, 14A-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	20	8-9	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	19	12-14	GNA	est 2:00PM-3:30PM
5.W.09	West	Burned-out	19	14-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Broken Window	18	8-9	GNA	est 2:00PM-3:30PM
5.W.09	West	Burned-out?	18	13-15	GNA	est 2:00PM-3:30PM
5.W.09	West	Debris Damage / Broken Window	17	13-14	GNA	est 2:00PM-3:30PM
5.W.09	West	Smoke?	17	14-15	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	33	15-16	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	32	15-18	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	31	15-18	GNA	est 2:00PM-3:30PM
5.W.09	South	Broken Window	31	18-19	GNA	est 2:00PM-3:30PM
5.W.09	South	Gash	31	19-20	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	30	15-18	GNA	est 2:00PM-3:30PM
5.W.09	South	Debris Damage / Broken Window	30	18-19	GNA	est 2:00PM-3:30PM
5.W.09	South	Gash	30	19-20	GNA	est 2:00PM-3:30PM
5.W.09	South	Broken Window	30	20-21	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	29	15-18	GNA	est 2:00PM-3:30PM
5.W.09	South	Broken Window	29	18-19	GNA	est 2:00PM-3:30PM
5.W.09	South	Gash	29	19-20	GNA	est 2:00PM-3:30PM
5.W.09	South	Gash	28	19-20	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	23	15-16	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	22	15-16	GNA	est 2:00PM-3:30PM
5.W.09	South	Burned-out	21	15-16	GNA	est 2:00PM-3:30PM
5.W.10	West	Burned-out	30	11-15	NIST	2:30PM-3:00PM
5.W.10	West	Burned-out	29	11-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	25	13-14	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage	25	14A-15	NIST	2:30PM-3:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.W.10	West	Broken Window	24	14A-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	23	12-13	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	22	3-4	NIST	2:30PM-3:00PM
5.W.10	West	Burned-out	22	13-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	21	13-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	20	8-9	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	19	8-9, 13-14	NIST	2:30PM-3:00PM
5.W.10	West	Burned-out	19	14-15	NIST	2:30PM-3:00PM
5.W.10	West	Burned-out	18	8-9, 13-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	17	7-8	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	17	13-14	NIST	2:30PM-3:00PM
5.W.10	West	Burned-out?	17	14-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	16	11-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	16	13-14A	NIST	2:30PM-3:00PM
5.W.10	West	Gash	16	14A-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	15	8-9, 11-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	15	13-14A	NIST	2:30PM-3:00PM
5.W.10	West	Gash	15	14A-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	14	2-3, 11-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	14	13-14A	NIST	2:30PM-3:00PM
5.W.10	West	Gash	14	14A-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	13	12-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	13	13-14	NIST	2:30PM-3:00PM
5.W.10	West	Gash	13	14-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	12	10-11, 12-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	12	13-14	NIST	2:30PM-3:00PM
5.W.10	West	Gash	12	14-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	11	9-10, 11-13	NIST	2:30PM-3:00PM
5.W.10	West	Debris Damage / Broken Window	11	13-14	NIST	2:30PM-3:00PM
5.W.10	West	Gash	11	14-15	NIST	2:30PM-3:00PM
5.W.10	West	Broken Window	10	9-10, 12-13	NIST	2:30PM-3:00PM
5.S.01	West	Debris Damage / Broken Window	46	14A-15	GNA	est after 2:00PM
5.S.01	West	Broken Window	45	13-14	GNA	est after 2:00PM
5.S.01	West	Debris Damage / Broken Window	45	14A-15	GNA	est after 2:00PM
5.S.01	West	Broken Window	44	11-12, 13-14	GNA	est after 2:00PM
5.S.01	West	Debris Damage / Broken Window	44	14A-15	GNA	est after 2:00PM
5.S.01	West	Debris Damage / Broken Window	43	14A-15	GNA	est after 2:00PM
5.S.01	West	Debris Damage / Broken Window	42	14A-15	GNA	est after 2:00PM
5.S.01	West	Debris Damage / Broken Window	41	14A-15	GNA	est after 2:00PM
5.S.01	West	Broken Window	40	14A-15	GNA	est after 2:00PM
5.S.01	West	Broken Window	38	14A-15	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	47	17-18	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	45	15-16	GNA	est after 2:00PM
5.S.01	South	Broken Window	45	16-18	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	44	15-16	GNA	est after 2:00PM
5.S.01	South	Broken Window	44	16-18	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	43	15-16	GNA	est after 2:00PM
5.S.01	South	Broken Window	43	16-18	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	42	15-16	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	41	15-16	GNA	est after 2:00PM
5.S.01	South	Broken Window	40	16-18	GNA	est after 2:00PM
5.S.01	South	Gash	40	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	39	16-18	GNA	est after 2:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.S.01	South	Gash	39	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	38	15-18	GNA	est after 2:00PM
5.S.01	South	Gash	38	19-20	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	37	18-19	GNA	est after 2:00PM
5.S.01	South	Gash	37	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	37	20-21	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	36	18-19	GNA	est after 2:00PM
5.S.01	South	Gash	36	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	36	20-21	GNA	est after 2:00PM
5.S.01	South	Broken Window	35	17-19, 20-23	GNA	est after 2:00PM
5.S.01	South	Gash	35	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	34	20-21	GNA	est after 2:00PM
5.S.01	South	Broken Window	35	21-24	GNA	est after 2:00PM
5.S.01	South	Broken Window	34	15-19, 21-22	GNA	est after 2:00PM
5.S.01	South	Gash	34	19-20	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	34	20-21	GNA	est after 2:00PM
5.S.01	South	Burned-out	33	15-16	GNA	est after 2:00PM
5.S.01	South	Broken Window	33	16-18, 21-23	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	33	18-19, 20-21	GNA	est after 2:00PM
5.S.01	South	Gash	33	19-20	GNA	est after 2:00PM
5.S.01	South	Broken Window	32	17-19, 21-23	GNA	est after 2:00PM
5.S.01	South	Gash	32	19-20	GNA	est after 2:00PM
5.S.01	South	Debris Damage / Broken Window	32	20-21	GNA	est after 2:00PM
5.S.02	West	Broken Window	45	13-14	GNA	est after 2:00PM
5.S.02	West	Debris Damage / Broken Window	45	14A-15	GNA	est after 2:00PM
5.S.02	West	Broken Window	44	11-12, 13-14	GNA	est after 2:00PM
5.S.02	West	Debris Damage / Broken Window	44	14A-15	GNA	est after 2:00PM
5.S.02	West	Debris Damage / Broken Window	43	14A-15	GNA	est after 2:00PM
5.S.02	West	Debris Damage / Broken Window	42	14-15	GNA	est after 2:00PM
5.S.02	West	Debris Damage / Broken Window	41	14A-15	GNA	est after 2:00PM
5.S.02	West	Broken Window	40	14A-15	GNA	est after 2:00PM
5.S.02	West	Broken Window	38	14A-15	GNA	est after 2:00PM
5.S.02	West	Burned-out	30	11-15	GNA	est after 2:00PM
5.S.02	West	Burned-out	29	11-15	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	47	16-18, 22-24	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	46	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	46	16-18	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	45	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	45	16-19	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	44	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	44	16-19	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	43	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	43	16-19	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	42	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	42	16-19	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	41	15-16	GNA	est after 2:00PM
5.S.02	South	Broken Window	41	16-19	GNA	est after 2:00PM
5.S.02	South	Broken Window	40	16-19	GNA	est after 2:00PM
5.S.02	South	Broken Window	39	16-18	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	39	18-19	GNA	est after 2:00PM
5.S.02	South	Broken Window	38	15-18	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	38	18-19	GNA	est after 2:00PM
5.S.02	South	Gash	38	19-20	GNA	est after 2:00PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
5.S.02	South	Broken Window	37	16-18, 21-24	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	37	18-19, 20-21	GNA	est after 2:00PM
5.S.02	South	Gash	37	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	36	16-18, 20-23	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	36	18-19	GNA	est after 2:00PM
5.S.02	South	Gash	36	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	35	16-19, 20-24	GNA	est after 2:00PM
5.S.02	South	Gash	35	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	34	15-16, 21-23	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	34	16-19, 20-21	GNA	est after 2:00PM
5.S.02	South	Gash	34	19-20	GNA	est after 2:00PM
5.S.02	South	Burned-out	33	15-19	GNA	est after 2:00PM
5.S.02	South	Gash	33	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	33	20-21	GNA	est after 2:00PM
5.S.02	South	Broken Window	33	21-25	GNA	est after 2:00PM
5.S.02	South	Burned-out	32	15-19	GNA	est after 2:00PM
5.S.02	South	Gash	32	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	32	20-21	GNA	est after 2:00PM
5.S.02	South	Broken Window	32	21-25	GNA	est after 2:00PM
5.S.02	South	Burned-out	31	15-19	GNA	est after 2:00PM
5.S.02	South	Gash	31	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	31	20-21	GNA	est after 2:00PM
5.S.02	South	Broken Window	31	21-24	GNA	est after 2:00PM
5.S.02	South	Burned-out	30	15-18	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	30	18-19, 20-21	GNA	est after 2:00PM
5.S.02	South	Gash	30	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	30	21-25	GNA	est after 2:00PM
5.S.02	South	Burned-out	29	15-18	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	29	18-19, 20-21	GNA	est after 2:00PM
5.S.02	South	Gash	29	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	29	21-25	GNA	est after 2:00PM
5.S.02	South	Broken Window	28	16-17, 21-25	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	28	17-19, 20-21	GNA	est after 2:00PM
5.S.02	South	Gash	28	19-20	GNA	est after 2:00PM
5.S.02	South	Broken Window	27	16-19, 21-24	GNA	est after 2:00PM
5.S.02	South	Gash	27	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	27	20-21	GNA	est after 2:00PM
5.S.02	South	Gash	26	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	26	20-21	GNA	est after 2:00PM
5.S.02	South	Broken Window	26	21-24	GNA	est after 2:00PM
5.S.02	South	Gash	25	19-20	GNA	est after 2:00PM
5.S.02	South	Debris Damage / Broken Window	25	20-21	GNA	est after 2:00PM
5.S.02	South	Broken Window	25	21-24	GNA	est after 2:00PM
5.S.02	South	Gash	24	19-20	GNA	est after 2:00PM
6.E.01	East	External Fire / Broken Window	13	29-32, 37-41?	GNA	est 3:20PM-3:40PM
6.E.01	East	Smoke	13	32-37?	GNA	est 3:20PM-3:40PM
6.E.01	North	Broken Window	12	42-43	GNA	est 3:20PM-3:40PM
6.E.01	North	Smoke	8	42-43	GNA	est 3:20PM-3:40PM
6.E.02	East	External Fire / Broken Window	13	29-30, 37-41?	NIST	likely 3:20PM-3:40PM
6.E.02	East	Smoke	13	30-37?	NIST	likely 3:20PM-3:40PM
6.E.02	North	Broken Window	12	42-43	NIST	likely 3:20PM-3:40PM
6.E.02	North	Smoke	8	42-43	NIST	likely 3:20PM-3:40PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.E.03	East	External Fire / Broken Window	13?	38-42?	GNA	est 3:20PM-3:40PM
6.E.03	North	Smoke	8?	42-43?	GNA	est 3:20PM-3:40PM
6.E.04	East	External Fire / Broken Window	13?	?	GNA	est 3:20PM-3:40PM
6.E.04	North	Smoke	8?	42-43?	GNA	est 3:20PM-3:40PM
6.N.01	North	Internal Fire / Broken Window	12	43-46	NIST	3:05PM +/- 300s
6.N.01	North	Broken Window	8	47-48	NIST	3:05PM +/- 300s
6.N.01	North	Internal Fire / Broken Window	7	49-51, 52-53	NIST	3:05PM +/- 300s
6.N.01	North	Internal Fire / Broken Window	7	54-55	NIST	3:05PM +/- 300s
6.N.01	North	Broken Window	7	51-52, 53-54	NIST	3:05PM +/- 300s
6.N.02	East	External Fire / Broken Window	12	39-40?	GNA	est 3:05PM-3:10PM
6.N.02	North	Internal Fire / Broken Window	12	42-46	GNA	est 3:05PM-3:10PM
6.N.02	North	Internal Fire / Broken Window	7	49-55, 56-57	GNA	est 3:05PM-3:10PM
6.N.02	North	Broken Window	7	55-56	GNA	est 3:05PM-3:10PM
6.N.03	East	External Fire / Broken Window	12	39-40?	GNA	est 3:05PM-3:10PM
6.N.03	North	Internal Fire / Broken Window	12	42-46	GNA	est 3:05PM-3:10PM
6.N.03	North	Internal Fire / Broken Window	7	49-51, 52-55	GNA	est 3:05PM-3:10PM
6.N.03	North	Internal Fire / Broken Window	7	56-57	GNA	est 3:05PM-3:10PM
6.N.03	North	Broken Window	7	51-52, 55-56	GNA	est 3:05PM-3:10PM
6.N.04	East	External Fire / Broken Window	12	41-42	NIST	3:10PM +/-300s
6.N.04	North	Internal Fire / Broken Window	12	42-47	NIST	3:10PM +/-300s
6.N.05	North	Internal Fire / Broken Window	12	42-43, 45-47	GNA	est 3:05PM-3:10PM
6.N.05	North	Internal Fire / Broken Window	7	48-50, 54-55	GNA	est 3:05PM-3:10PM
6.N.06	North	Internal Fire / Broken Window	12	45-48	NIST	3:10:46PM +/-3s
6.N.06	North	Internal Fire / Broken Window	7	47-50	NIST	3:10:46PM +/-3s
6.N.07	North	Internal Fire / Broken Window	12	45-48	NIST	3:10:46PM-3:13:46PM
6.N.07	North	Internal Fire / Broken Window	7	47-50	NIST	3:10:46PM-3:13:46PM
6.N.08	North	Burned-out	12	44-46	GNA	est 3:10PM-3:17PM
6.N.08	North	Internal Fire / Broken Window	12	46-49	GNA	est 3:10PM-3:17PM
6.N.08	North	Internal Fire / Broken Window	7	47-51	GNA	est 3:10PM-3:17PM
6.N.09	North	Burned-out	12	44-46	NIST	3:12:50PM +/-300s
6.N.09	North	Internal Fire / Broken Window	12	46-49	NIST	3:12:50PM +/-300s
6.N.09	North	Internal Fire / Broken Window	7	47-51	NIST	3:12:50PM +/-300s
6.N.10	North	Burned-out	12	45-46	NIST	3:11:15PM-3:16:51PM
6.N.10	North	Internal Fire / Broken Window	12	46-49	NIST	3:11:15PM-3:16:51PM
6.N.11	North	Internal Fire / Broken Window	13	44-46	GNA	est 3:20PM-3:54PM
6.N.12	North	Internal Fire / Broken Window	13	45-46	NIST	3:41PM +/-180s
6.N.12	North	Internal Fire / Broken Window	12	50-54	NIST	3:41PM +/-180s
6.N.12	North	Internal Fire / Broken Window	8	47-54	NIST	3:41PM +/-180s
6.N.12	North	Burned-out	7	47-54	NIST	3:41PM +/-180s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.N.13	North	Internal Fire / Broken Window	13	44-46	NIST	3:42:30PM +/-120s
6.N.13	North	Burned-out	12	45-48, 49-50	NIST	3:42:30PM +/-120s
6.N.13	North	Internal Fire / Broken Window	12	50-52	NIST	3:42:30PM +/-120s
6.N.13	North	Internal Fire / Broken Window	8	47-52	NIST	3:42:30PM +/-120s
6.N.13	North	Burned-out	7	48-50	NIST	3:42:30PM +/-120s
6.N.14	North	Burned-out	12	50-54	NIST	around 3:42PM +/-300s
6.N.14	North	Internal Fire / Broken Window	8	51-52	NIST	around 3:42PM +/-300s
6.N.14	North	Burned-out	8	52-1	NIST	around 3:42PM +/-300s
6.N.14	North	Burned-out	7	51-1	NIST	around 3:42PM +/-300s
6.N.14	West	Smoke	8	1-5, 6-8	NIST	around 3:42PM +/-300s
6.N.14	West	External Fire / Broken Window	8	5-6	NIST	around 3:42PM +/-300s
6.N.14	West	Broken Window	8	10-12	NIST	around 3:42PM +/-300s
6.N.14	West	Burned-out?	7	3-10	NIST	around 3:42PM +/-300s
6.N.15	North	Burned-out	13	42-44	NIST	3:44PM +/-240s
6.N.15	North	Smoke	13	44-46	NIST	3:44PM +/-240s
6.N.15	North	Burned-out	12	42-51, 52-54	NIST	3:44PM +/-240s
6.N.15	North	Internal Fire / Broken Window	12	51-52, 55-56	NIST	3:44PM +/-240s
6.N.15	North	Internal Fire / Broken Window	8	47-48, 49-51	NIST	3:44PM +/-240s
6.N.15	North	External Fire / Broken Window	8	48-49	NIST	3:44PM +/-240s
6.N.15	North	Burned-out	8	51-57	NIST	3:44PM +/-240s
6.N.15	North	Burned-out	7	47-57	NIST	3:44PM +/-240s
6.N.16	North	Internal Fire / Broken Window	13	44-46	NIST	3:50:13PM +/-180s
6.N.16	North	Internal Fire / Broken Window	12	50-53	NIST	3:50:13PM +/-180s
6.N.16	North	Internal Fire / Broken Window	8	46-52	NIST	3:50:13PM +/-180s
6.N.16	North	Burned-out	7	48-50	NIST	3:50:13PM +/-180s
6.N.17	North	Burned-out	13	42-43, 44-47	NIST	3:49PM-3:54PM
6.N.17	North	Internal Fire / Broken Window	13	43-45	NIST	3:49PM-3:54PM
6.N.17	North	Burned-out	12	42-51, 53-54	NIST	3:49PM-3:54PM
6.N.17	North	Internal Fire / Broken Window	12	51-53	NIST	3:49PM-3:54PM
6.N.17	North	Internal Fire / Broken Window	8	43-52	NIST	3:49PM-3:54PM
6.N.17	North	Burned-out	8	51-55	NIST	3:49PM-3:54PM
6.N.17	North	Broken Window	7	43-45	NIST	3:49PM-3:54PM
6.N.17	North	Burned-out	7	47-55	NIST	3:49PM-3:54PM
6.N.18	North	Internal Fire / Broken Window	8	45-50	NIST	3:49:30PM-3:54:30PM
6.N.18	North	Burned-out	7	47-50	NIST	3:49:30PM-3:54:30PM
6.N.19	North	Smoke	13	43-44	NIST	3:51PM-3:58PM
6.N.19	North	Internal Fire / Broken Window	13	44-45	NIST	3:51PM-3:58PM
6.N.19	North	Not Visible	13	45-47	NIST	3:51PM-3:58PM
6.N.19	North	Burned-out	13	47-48	NIST	3:51PM-3:58PM
6.N.19	North	Burned-out	12	43-52, 53-54	NIST	3:51PM-3:58PM
6.N.19	North	Internal Fire / Broken Window	12	52-53	NIST	3:51PM-3:58PM
6.N.19	North	External Fire / Broken Window	8	44-45	NIST	3:51PM-3:58PM
6.N.19	North	Not Visible	8	45-46	NIST	3:51PM-3:58PM
6.N.19	North	Internal Fire / Broken Window	8	46-52	NIST	3:51PM-3:58PM
6.N.19	North	Burned-out	8	51-53	NIST	3:51PM-3:58PM
6.N.19	North	Burned-out	7	47-52	NIST	3:51PM-3:58PM
6.N.20	North	Burned-out	12	50-51	NIST	3:54:14PM +/-210s

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.N.20	North	Internal Fire / Broken Window	12	51-53	NIST	3:54:14PM +/-210s
6.N.20	North	Internal Fire / Broken Window	8	45-52	NIST	3:54:14PM +/-210s
6.N.21	North	Burned-out	13	44-48	NIST	near 3:55PM
6.N.21	North	Internal Fire / Broken Window	13	48-49	NIST	near 3:55PM
6.N.21	North	Burned-out	12	44-55	NIST	near 3:55PM
6.N.21	North	Internal Fire / Broken Window	9	54-55	NIST	near 3:55PM
6.N.21	North	Internal Fire / Broken Window	8	43-51	NIST	near 3:55PM
6.N.21	North	Burned-out	8	51-55	NIST	near 3:55PM
6.N.21	North	Not Visible	7	47-50	NIST	near 3:55PM
6.N.21	North	Burned-out	7	50-54	NIST	near 3:55PM
6.N.22	North	Burned-out	13	42-43, 45-48	NIST	3:53PM-4:02PM
6.N.22	North	Internal Fire / Broken Window	13	43-46	NIST	3:53PM-4:02PM
6.N.22	North	Burned-out	12	42-48	NIST	3:53PM-4:02PM
6.N.22	North	Smoke	8	42-44	NIST	3:53PM-4:02PM
6.N.22	North	Internal Fire / Broken Window	8	44-46	NIST	3:53PM-4:02PM
6.N.23	East	External Fire / Broken Window	8	41-42	NIST	3:55PM-4:04PM
6.N.23	East	Smoke	6	40-41?	NIST	3:55PM-4:04PM
6.N.23	North	Not Visible	13	42-43	NIST	3:55PM-4:04PM
6.N.23	North	Internal Fire / Broken Window	13	43-45	NIST	3:55PM-4:04PM
6.N.23	North	Burned-out	12	42-45	NIST	3:55PM-4:04PM
6.N.23	North	Smoke	8	42-43	NIST	3:55PM-4:04PM
6.N.23	North	Internal Fire / Broken Window	8	42-45	NIST	3:55PM-4:04PM
6.N.23	North	Burned-out	8	45-46	NIST	3:55PM-4:04PM
6.N.24	East	External Fire / Broken Window	8	41-42	GNA	est 3:55PM-4:04PM
6.N.24	North	Smoke	8	42-43	GNA	est 3:55PM-4:04PM
6.N.25	East	External Fire / Broken Window	8	41-42	GNA	est 3:55PM-4:04PM
6.N.25	North	Smoke	8	42-43	GNA	est 3:55PM-4:04PM
6.N.25	North	Internal Fire / Broken Window	8	42-45	GNA	est 3:55PM-4:04PM
6.W.01	West	Debris Damage / Broken Window	46	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	45	13-14	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage / Broken Window	45	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	44	11-12, 13-14	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage / Broken Window	44	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage / Broken Window	43	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage / Broken Window	42	14-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	41	11-12	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage / Broken Window	41	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	40	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	38	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Burned-out	30	11-15	GNA	est shortly after 3:00PM
6.W.01	West	Burned-out	29	11-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	28	9-10	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	25	13-14	GNA	est shortly after 3:00PM
6.W.01	West	Debris Damage	25	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	24	14A-15	GNA	est shortly after 3:00PM
6.W.01	West	Broken Window	23	12-14	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage / Broken Window	46	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage / Broken Window	45	14-15	GNA	est shortly after 3:00PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.01	South	Debris Damage / Broken Window	44	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage	43	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage / Broken Window	42	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage	41	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Broken Window	38	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Broken Window	31	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Burned-out	30	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Broken Window	29	15-16	GNA	est shortly after 3:00PM
6.W.01	South	Debris Damage	25	15-16	GNA	est shortly after 3:00PM
6.W.02	West	Broken Window	31	5-6	GNA	est shortly after 3:00PM
6.W.02	West	Burned-out	30	11-15	GNA	est shortly after 3:00PM
6.W.02	West	Burned-out	29	11-15	GNA	est shortly after 3:00PM
6.W.02	West	Broken Window	28	9-10	GNA	est shortly after 3:00PM
6.W.02	West	Broken Window	25	13-14	GNA	est shortly after 3:00PM
6.W.02	West	Debris Damage	25	14A-15	GNA	est shortly after 3:00PM
6.W.02	West	Broken Window	24	14A-15	GNA	est shortly after 3:00PM
6.W.02	West	Broken Window	23	12-14	GNA	est shortly after 3:00PM
6.W.02	West	Smoke?	22	14-15	GNA	est shortly after 3:00PM
6.W.02	South	Broken Window	31	15-16	GNA	est shortly after 3:00PM
6.W.02	South	Burned-out	30	15-16	GNA	est shortly after 3:00PM
6.W.02	South	Burned-out	29	15-16	GNA	est shortly after 3:00PM
6.W.02	South	Debris Damage	25	15-16	GNA	est shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	46	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	45	13-14	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	45	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	44	11-12, 13-14	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	44	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	43	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	42	14-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	41	11-12	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage / Broken Window	41	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	40	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	38	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	31	5-6	NIST	shortly after 3:00PM
6.W.03	West	Burned-out	30	11-15	NIST	shortly after 3:00PM
6.W.03	West	Burned-out	29	11-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	28	9-10	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	25	13-14	NIST	shortly after 3:00PM
6.W.03	West	Debris Damage	25	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	24	14A-15	NIST	shortly after 3:00PM
6.W.03	West	Broken Window	23	12-14	NIST	shortly after 3:00PM
6.W.03	West	Burned-out	22	13-15	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage / Broken Window	46	15-16	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage / Broken Window	45	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	45	16-17	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage / Broken Window	44	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	44	16-17	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage	43	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	43	16-17	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage / Broken Window	42	15-16	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage / Broken Window	41	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	40	16-17	NIST	shortly after 3:00PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.03	South	Broken Window	39	16-17	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	38	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	31	15-16	NIST	shortly after 3:00PM
6.W.03	South	Broken Window	30	15-16	NIST	shortly after 3:00PM
6.W.03	South	Debris Damage	25	15-16	NIST	shortly after 3:00PM
6.W.04	West	Debris Damage	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.04	West	Debris Damage	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.04	West	Debris Damage / Broken Window	44	14-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Debris Damage	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke Obscures	21	13-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke Obscures	20	13-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke Obscures	19	13-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke?	18	8-9, 13-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	17	13-14	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke Obscures	17	14-15	GNA	est 3:00PM-4:30PM
6.W.04	West	Broken Window	16	13-14	GNA	est 3:00PM-4:30PM
6.W.04	West	Smoke Obscures	16	14-15	GNA	est 3:00PM-4:30PM
6.W.05	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.05	West	Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.05	West	Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.05	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.05	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.06	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	20	8-9, 14A-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Broken Window	19	12-14	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.06	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Smoke?	18	8-9	GNA	est 3:00PM-4:30PM
6.W.06	West	Smoke Obscures	18	14-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Smoke	17	14-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	16	14-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	15	14-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	14	13-15	GNA	est 3:00PM-4:30PM
6.W.06	West	Debris Damage / Broken Window	13	13-14	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage / Broken Window	47	17-18	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	46	15-16	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage / Broken Window	46	17-18	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	45	15-16	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	44	15-16	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	43	15-16	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	42	15-16	GNA	est 3:00PM-4:30PM
6.W.06	South	Debris Damage	41	15-16	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM
6.W.07	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.07	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.07	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	19	12-14	GNA	est 3:00PM-4:30PM
6.W.07	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Smoke?	18	13?-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Smoke?	17	13?-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	16	13-14	GNA	est 3:00PM-4:30PM
6.W.07	West	Debris Damage / Broken Window	16	14-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Broken Window	15	13-14	GNA	est 3:00PM-4:30PM
6.W.07	West	Debris Damage / Broken Window	15	14-15	GNA	est 3:00PM-4:30PM
6.W.07	West	Debris Damage / Broken Window	14	14-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	44	13-14	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	44	14-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.08	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.08	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.08	West	Debris Damage	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Broken Window	19	13-14	GNA	est 3:00PM-4:30PM
6.W.08	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.08	West	Smoke?	18	14-15	GNA	est 3:00PM-4:30PM
6.W.09	West	Burned-out	30	12-15	GNA	est 3:00PM-4:30PM
6.W.09	West	Burned-out	29	12-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Broken Window	44	13-14	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Broken Window	41	11-12	GNA	est 3:00PM-4:30PM
6.W.10	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Burned-out	30	12-15	GNA	est 3:00PM-4:30PM
6.W.10	West	Burned-out	29	12-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.11	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Burned-out	30	14A-15	GNA	est 3:00PM-4:30PM
6.W.11	West	Burned-out	29	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.12	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.12	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.12	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.12	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	46	15-16	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	43	15-16	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.12	South	Debris Damage / Broken Window	41	15-16	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Broken Window	44	13-14	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.13	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.13	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.13	West	Smoke?	22	13-15	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	46	15-16	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	43	15-16	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.13	South	Debris Damage / Broken Window	41	15-16	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Broken Window	44	13-14	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.14	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Smoke Obscures	24	9-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Smoke Obscures	23	9-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Smoke Obscures	22	9-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Smoke Obscures	21	9-15	GNA	est 3:00PM-4:30PM
6.W.14	West	Smoke Obscures	20	9-15	GNA	est 3:00PM-4:30PM
6.W.14	South	Debris Damage	46	15-16	GNA	est 3:00PM-4:30PM
6.W.14	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.14	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.14	South	Debris Damage	43	15-16	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.14	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.14	South	Debris Damage / Broken Window	41	15-16	GNA	est 3:00PM-4:30PM
6.W.14	South	Smoke Obscures	41+	16-28	GNA	est 3:00PM-4:30PM
6.W.14	South	Smoke Obscures	20+	15-28	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	44	13-14	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	41	11-12	GNA	est 3:00PM-4:30PM
6.W.15	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM
6.W.15	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.15	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.15	West	Smoke Obscures	24	12-15	GNA	est 3:00PM-4:30PM
6.W.15	West	Smoke Obscures	23	12-15	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage	46	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage	43	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Debris Damage / Broken Window	41	15-16	GNA	est 3:00PM-4:30PM
6.W.15	South	Broken Window	37	17-19	GNA	est 3:00PM-4:30PM
6.W.15	South	Broken Window	36	17-19	GNA	est 3:00PM-4:30PM
6.W.15	South	Broken Window	35	17-19	GNA	est 3:00PM-4:30PM
6.W.15	South	Broken Window	34	17-19	GNA	est 3:00PM-4:30PM
6.W.15	South	Smoke Obscures	37	15-17, 19-28	GNA	est 3:00PM-4:30PM
6.W.15	South	Smoke Obscures	36	15-17, 19-28	GNA	est 3:00PM-4:30PM
6.W.15	South	Smoke Obscures	35	15-17, 19-28	GNA	est 3:00PM-4:30PM
6.W.15	South	Smoke Obscures	34	15-17, 19-28	GNA	est 3:00PM-4:30PM
6.W.15	South	Smoke Obscures	23+	15-28	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	41	11-12	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.16	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	23	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	19	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Smoke	18	13-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Smoke	17	13-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	16	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	16	14-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Broken Window	15	13-14	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	15	14-15	GNA	est 3:00PM-4:30PM
6.W.16	West	Debris Damage / Broken Window	14	13-15	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	46	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	43	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	41	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	38	15-17	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	37	16-17, 21-23	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	36	16-17, 18-19	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	36	20-23	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	36	19-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	35	15-17, 20-22	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	35	19-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	34	15-19	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	34	19-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	31	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Burned-out	30	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Burned-out	29	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	25	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	21	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	20	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	19	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	15	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	14	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	14	16-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage	13	15-16	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	13	16-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	13	20-23	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	12	16-20	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	12	20-23	GNA	est 3:00PM-4:30PM
6.W.16	South	Gash	11	18-19	GNA	est 3:00PM-4:30PM
6.W.16	South	Debris Damage / Broken Window	11	19-21	GNA	est 3:00PM-4:30PM
6.W.16	South	Broken Window	11	21-24	GNA	est 3:00PM-4:30PM
6.W.17	West	Burned-out	30	12-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	21	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	19	8-9	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.17	West	Broken Window	19	13-14	GNA	est 3:00PM-4:30PM
6.W.17	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke	18	8-9	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke Obscures	18	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	17	7-8	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke Obscures	17	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	16	13-14	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke Obscures	16	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	15	8-9	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	15	13-14A	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	15	14A-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	14	2-3, 11-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	14	13-14A	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	14	14A-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	13	12-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	13	13-14	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	13	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	12	10-11, 12-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	12	13-14	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	12	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	11	9-10, 11-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	11	13-14	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	11	14-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	10	9-10, 11-12	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	10	12-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	10	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage	9	6-7	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	9	10-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Gash	9	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Smoke Obscures??	8	2-5	GNA	est 3:00PM-4:30PM
6.W.17	West	Broken Window	8	6-7, 8-9, 10-13	GNA	est 3:00PM-4:30PM
6.W.17	West	Debris Damage / Broken Window	8	13-15	GNA	est 3:00PM-4:30PM
6.W.17	West	Burned-out	7	5-11	GNA	est 3:00PM-4:30PM
6.W.18	West	Burned-out	30	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Burned-out	29	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	19	8-9	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	19	13-14	GNA	est 3:00PM-4:30PM
6.W.18	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Smoke	18	8-9	GNA	est 3:00PM-4:30PM
6.W.18	West	Smoke Obscures	18	13-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	17	7-8	GNA	est 3:00PM-4:30PM
6.W.18	West	Smoke Obscures	17	13-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	16	13-14	GNA	est 3:00PM-4:30PM
6.W.18	West	Smoke Obscures	16	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	15	8-9	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	15	13-14	GNA	est 3:00PM-4:30PM
6.W.18	West	Smoke Obscures	15	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	14	11-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	14	13-14A	GNA	est 3:00PM-4:30PM
6.W.18	West	Gash	14	14A-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	13	12-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	13	13-14	GNA	est 3:00PM-4:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.18	West	Gash	13	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	12	10-11, 12-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	12	13-14	GNA	est 3:00PM-4:30PM
6.W.18	West	Gash	12	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	11	9-10, 11-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	11	13-14	GNA	est 3:00PM-4:30PM
6.W.18	West	Gash	11	14-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	10	9-10, 11-12	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	10	12-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Gash	10	13-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage	9	6-7	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	9	10-13	GNA	est 3:00PM-4:30PM
6.W.18	West	Gash	9	13-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Broken Window	8	6-7, 8-9, 10-12	GNA	est 3:00PM-4:30PM
6.W.18	West	Debris Damage / Broken Window	8	12-15	GNA	est 3:00PM-4:30PM
6.W.18	West	Burned-out	7	5-11	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.19	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	21	13-14, 14A-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.19	West	Debris Damage	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	19	8-9, 12-14	GNA	est 3:00PM-4:30PM
6.W.19	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Smoke	18	8-9, 13-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Broken Window	17	7-8	GNA	est 3:00PM-4:30PM
6.W.19	West	Smoke Obscures	17	6-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Smoke Obscures	16	6-15	GNA	est 3:00PM-4:30PM
6.W.19	West	Smoke Obscures	15	6-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM
6.W.20	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	21	13-14, 14A-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.20	West	Debris Damage	20	14A-15	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.20	West	Broken Window	19	8-9, 12-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Smoke	18	8-9, 13-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Broken Window	17	7-8, 13-14	GNA	est 3:00PM-4:30PM
6.W.20	West	Smoke Obscures	17	14-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Smoke Obscures	16	11-15	GNA	est 3:00PM-4:30PM
6.W.20	West	Smoke Obscures	15	11-15	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage	46	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage / Broken Window	45	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage / Broken Window	44	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage	43	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage / Broken Window	42	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage	41	15-16	GNA	est 3:00PM-4:30PM
6.W.20	South	Debris Damage	25	15-16	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Debris Damage	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Smoke	18	14-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Smoke?	17	8-11	GNA	est 3:00PM-4:30PM
6.W.21	West	Smoke Obscures	17	14-15	GNA	est 3:00PM-4:30PM
6.W.21	West	Smoke Obscures	16	14-15	GNA	est 3:00PM-4:30PM
6.W.21	South	Debris Damage	46	15-16	GNA	est 3:00PM-4:30PM
6.W.21	South	Debris Damage	45	15-16	GNA	est 3:00PM-4:30PM
6.W.21	South	Debris Damage	44	15-16	GNA	est 3:00PM-4:30PM
6.W.21	South	Debris Damage	42	15-16	GNA	est 3:00PM-4:30PM
6.W.21	South	Debris Damage	41	15-16	GNA	est 3:00PM-4:30PM
6.W.22	West	Debris Damage	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Debris Damage	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Smoke?	24	14-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Smoke	18	14-15	GNA	est 3:00PM-4:30PM
6.W.22	West	Burned-out?	17	8-11	GNA	est 3:00PM-4:30PM
6.W.22	West	Smoke Obscures	17	14-15	GNA	est 3:00PM-4:30PM
6.W.22	South	Debris Damage	42	15-16	GNA	est 3:00PM-4:30PM
6.W.22	South	Debris Damage	41	15-16	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.23	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.23	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.23	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	21	14-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.23	West	Broken Window	19	8-9, 12-14	GNA	est 3:00PM-4:30PM
6.W.23	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Smoke Obscures	18	8-9, 13-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Smoke Obscures	17	6-15	GNA	est 3:00PM-4:30PM
6.W.23	West	Smoke Obscures	16	6-15	GNA	est 3:00PM-4:30PM
6.W.23	South	Burned-out	30	15-16	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Broken Window	20	8-9	GNA	est 3:00PM-4:30PM
6.W.24	West	Debris Damage / Broken Window	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Broken Window	19	8-9, 12-14	GNA	est 3:00PM-4:30PM
6.W.24	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke Obscures	18	6-8	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke	18	8-9, 14-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke Obscures	17	6-10, 14-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Broken Window	17	13-14	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke Obscures	16	6-11	GNA	est 3:00PM-4:30PM
6.W.24	West	Broken Window	16	11-12, 13-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke Obscures	15	9-15	GNA	est 3:00PM-4:30PM
6.W.24	West	Smoke Obscures	14	9-15	GNA	est 3:00PM-4:30PM
6.W.24	South	Debris Damage	21	15-16	GNA	est 3:00PM-4:30PM
6.W.24	South	Debris Damage	19	15-16	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM
6.W.25	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.25	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.25	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.25	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.25	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	46	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	45	13-14	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	45	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	44	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	41	11-12	GNA	est 3:00PM-4:30PM
6.W.26	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.26	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	21	14-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Smoke Obscures	18	8-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Broken Window	17	7-8	GNA	est 3:00PM-4:30PM
6.W.26	West	Smoke Obscures	17	10-15	GNA	est 3:00PM-4:30PM
6.W.26	West	Smoke Obscures	16	10-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	44	11-12, 13-14	GNA	est 3:00PM-4:30PM
6.W.27	West	Debris Damage / Broken Window	43	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Debris Damage / Broken Window	42	14-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Broken Window	21	14A-15	GNA	est 3:00PM-4:30PM
6.W.27	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.28	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.28	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Debris Damage	20	14A-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Smoke	18	8-9	GNA	est 3:00PM-4:30PM
6.W.28	West	Broken Window	17	7-8	GNA	est 3:00PM-4:30PM
6.W.28	West	Smoke Obscures	18	12-15	GNA	est 3:00PM-4:30PM
6.W.28	West	Smoke Obscures	17	12-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Debris Damage / Broken Window	42	14A-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	41	11-12	GNA	est 3:00PM-4:30PM
6.W.29	West	Debris Damage / Broken Window	41	14A-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	40	14A-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	38	14A-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	31	5-6	GNA	est 3:00PM-4:30PM
6.W.29	West	Burned-out	30	11-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Burned-out	29	11-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	28	9-10	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	25	13-14	GNA	est 3:00PM-4:30PM
6.W.29	West	Debris Damage	25	14A-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	24	14A-15	GNA	est 3:00PM-4:30PM

Guy Nordenson and Associates

Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.29	West	Broken Window	23	12-14	GNA	est 3:00PM-4:30PM
6.W.29	West	Smoke	22	13-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	21	13-15	GNA	est 3:00PM-4:30PM
6.W.29	West	Broken Window	19	13-14	GNA	est 3:00PM-4:30PM
6.W.29	West	Burned-out	19	14-15	GNA	est 3:00PM-4:30PM
6.W.29	South	Debris Damage	42	15-16	GNA	est 3:00PM-4:30PM
6.W.29	South	Debris Damage	41	15-16	GNA	est 3:00PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	46	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	45	13-14	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	45	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	44	11-12, 13-14	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	44	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	43	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	42	14-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	41	11-12	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	41	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	40	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	38	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	31	5-6	NIST	3:30PM-4:30PM
6.W.30	West	Burned-out	30	11-15	NIST	3:30PM-4:30PM
6.W.30	West	Burned-out	29	11-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	28	9-10	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	25	13-14	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage	25	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	24	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	23	12-14	NIST	3:30PM-4:30PM
6.W.30	West	Smoke	22	13-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	21	13-15	NIST	3:30PM-4:30PM
6.W.30	West	Debris Damage / Broken Window	20	14A-15	NIST	3:30PM-4:30PM
6.W.30	West	Broken Window	19	12-14	NIST	3:30PM-4:30PM
6.W.30	West	Burned-out	19	14-15	NIST	3:30PM-4:30PM
6.W.30	West	Smoke	18	14-15	NIST	3:30PM-4:30PM
6.W.30	West	Smoke Obscures	18	8-15	NIST	3:30PM-4:30PM
6.W.30	West	Smoke Obscures	17	8-15	NIST	3:30PM-4:30PM
6.W.30	West	Smoke Obscures	16	8-15	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage	46	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage / Broken Window	45	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage / Broken Window	44	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage	43	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage / Broken Window	42	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage / Broken Window	41	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Burned-out	30	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Burned-out	29	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Broken Window	28	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage	25	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage	20	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Debris Damage	19	15-16	NIST	3:30PM-4:30PM
6.W.30	South	Smoke Obscures	All	15-18	NIST	3:30PM-4:30PM
6.W.31	West	Burned-out	30	14?-15	GNA	est 3:30PM-4:30PM
6.W.31	West	Burned-out	29	12?-15	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	38	17-19	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	38	19-20	GNA	est 3:30PM-4:30PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
6.W.31	South	Broken Window	37	16-19, 20-22	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	37	19-20	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	36	16-19, 20-22	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	36	19-20	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	35	16-19, 20-22	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	35	19-20	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	34	17-19, 20-22	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	34	19-20	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	33	17-19, 20-22	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	33	19-20	GNA	est 3:30PM-4:30PM
6.W.31	South	Broken Window	32	18-19	GNA	est 3:30PM-4:30PM
6.W.31	South	Gash	32	19-20	GNA	est 3:30PM-4:30PM
6.W.32	West	Internal Fire / Broken Window	8	2-3, 4-6	NIST	3:41:30PM +/-300s
6.W.32	West	External Fire / Broken Window	8	3-4	NIST	3:41:30PM +/-300s
6.W.32	West	Burned-out	7	1-3	NIST	3:41:30PM +/-300s
7.E.01	East	External Fire / Broken Window?	7?	41-42?	GNA	est after 4:00PM
7.E.02	East	Smoke	6?	36-39?	GNA	est after 4:00PM
7.E.03	East	External Fire / Broken Window	13	41-42	GNA	est 4:15PM-4:38PM
7.E.03	East	Internal Fire / Broken Window	9	41-42	GNA	est 4:15PM-4:38PM
7.E.03	East	Smoke Obscures	8+		GNA	est 4:15PM-4:38PM
7.E.03	North	Burned-out	13	42-43	GNA	est 4:15PM-4:38PM
7.E.03	North	Burned-out	12	42-43	GNA	est 4:15PM-4:38PM
7.E.03	North	Internal Fire / Broken Window	9	42-43	GNA	est 4:15PM-4:38PM
7.E.03	North	Burned-out	8	42-43	GNA	est 4:15PM-4:38PM
7.E.04	East	External Fire / Broken Window	13	41-42	GNA	est 4:15PM-4:38PM
7.E.04	East	Internal Fire / Broken Window	9	41-42	GNA	est 4:15PM-4:38PM
7.E.04	East	External Fire / Broken Window	8	29-34?	GNA	est 4:15PM-4:38PM
7.E.04	East	External Fire / Broken Window	7	29-33?	GNA	est 4:15PM-4:38PM
7.E.04	East	Smoke	6	36-39?	GNA	est 4:15PM-4:38PM
7.E.04	East	Smoke Obscures	10+		GNA	est 4:15PM-4:38PM
7.E.04	North	Burned-out	13	42-43	GNA	est 4:15PM-4:38PM
7.E.04	North	Burned-out	12	42-43	GNA	est 4:15PM-4:38PM
7.E.04	North	Internal Fire / Broken Window	9	42-43	GNA	est 4:15PM-4:38PM
7.E.04	North	Burned-out	8	42-43	GNA	est 4:15PM-4:38PM
7.N.01	North	Internal Fire / Broken Window	9	49-50, 51-53	NIST	4:10PM +/-300s
7.N.01	North	Internal Fire / Broken Window	8	45-49	NIST	4:10PM +/-300s
7.N.01	North	Burned-out	8	49-54	NIST	4:10PM +/-300s
7.N.01	North	Burned-out	7	49-51	NIST	4:10PM +/-300s
7.N.01	North	Not Visible	7	51-54	NIST	4:10PM +/-300s
7.N.02	North	Internal Fire / Broken Window	12	51-52	NIST	likely 4:15PM
7.N.02	North	Internal Fire / Broken Window	9	45-50, 52-53	NIST	likely 4:15PM
7.N.02	North	Internal Fire / Broken Window	8	48-49	NIST	likely 4:15PM
7.N.02	North	Internal Fire / Broken Window	7	46-47	NIST	likely 4:15PM
7.N.03	North	Internal Fire / Broken Window	9	45-50, 52-53	GNA	est 4:15PM-4:38PM
7.N.04	North	Internal Fire / Broken Window	12	51-52	GNA	est 4:15PM-4:38PM

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
7.N.04	North	Internal Fire / Broken Window	9	45-48	GNA	est 4:15PM-4:38PM
7.N.05	North	Burned-out	9	44-45, 46-48	NIST	4:38:11PM +/-1s
7.N.05	North	Internal Fire / Broken Window	9	45-46	NIST	4:38:11PM +/-1s
7.N.05	North	Burned-out	8	44-48	NIST	4:38:11PM +/-1s
7.N.05	North	Burned-out	7	44-45, 46-48	NIST	4:38:11PM +/-1s
7.N.05	North	Internal Fire / Broken Window	7	45-46	NIST	4:38:11PM +/-1s
7.N.06	North	Burned-out	13	44-48	NIST	4:38:14PM +/-1s
7.N.06	North	Burned-out	12	44-48	NIST	4:38:14PM +/-1s
7.N.06	North	Internal Fire / Broken Window	11	44-47	NIST	4:38:14PM +/-1s
7.N.06	North	Burned-out	9	44-48	NIST	4:38:14PM +/-1s
7.N.07	North	Internal Fire / Broken Window	11	45-49	NIST	likely 4:39PM +/-120s
7.N.07	North	Internal Fire / Broken Window	9	45-47	NIST	likely 4:39PM +/-120s
7.N.07	North	Burned-out	9	47-49	NIST	likely 4:39PM +/-120s
7.N.07	North	Internal Fire / Broken Window	8	45-47	NIST	likely 4:39PM +/-120s
7.N.07	North	Burned-out	8	47-49	NIST	likely 4:39PM +/-120s
7.N.07	North	Burned-out	7	45-46, 47-48	NIST	likely 4:39PM +/-120s
7.N.07	North	Internal Fire / Broken Window	7	46-47	NIST	likely 4:39PM +/-120s
7.W.01	West	Burned-out	30	13-15	GNA	est after 4:00PM
7.W.01	West	Burned-out	29	13-15	GNA	est after 4:00PM
7.W.02	West	Burned-out	30	13-15	GNA	est after 4:00PM
7.W.02	West	Burned-out	29	13-15	GNA	est after 4:00PM
7.W.03	West	Burned-out	30	13-15	GNA	est after 4:00PM
7.W.03	West	Burned-out	29	13-15	GNA	est after 4:00PM
7.S.01	West	Broken Window	38	14A-15	NIST	mid-late afternoon
7.S.01	West	Burned-out	30	12-15	NIST	mid-late afternoon
7.S.01	West	Burned-out	29	12-15	NIST	mid-late afternoon
7.S.01	South	Broken Window	41	20-22	NIST	mid-late afternoon
7.S.01	South	Gash	40	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	40	20-23	NIST	mid-late afternoon
7.S.01	South	Broken Window	39	17-18	NIST	mid-late afternoon
7.S.01	South	Debris Damage / Broken Window	39	18-19	NIST	mid-late afternoon
7.S.01	South	Gash	39	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	38	17-18	NIST	mid-late afternoon
7.S.01	South	Debris Damage / Broken Window	38	18-19	NIST	mid-late afternoon
7.S.01	South	Gash	38	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	37	16-18, 20-23	NIST	mid-late afternoon
7.S.01	South	Debris Damage / Broken Window	37	18-19	NIST	mid-late afternoon
7.S.01	South	Gash	37	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	36	16-19, 20-22	NIST	mid-late afternoon
7.S.01	South	Gash	36	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	35	16-19, 20-22	NIST	mid-late afternoon
7.S.01	South	Gash	35	19-20	NIST	mid-late afternoon
7.S.01	South	Broken Window	34	17-19, 21-22	NIST	mid-late afternoon
7.S.01	South	Gash	34	19-20	NIST	mid-late afternoon
7.S.01	South	Debris Damage / Broken Window	34	20-21	NIST	mid-late afternoon
7.S.01	South	Broken Window	33	17-19, 20-21	NIST	mid-late afternoon
7.S.01	South	Gash	33	19-20	NIST	mid-late afternoon

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Photo	Façade	Type of Visible Damage	Floor Level	Column Lines	Time Source	Time
7.S.01	South	Burned-out	32	15-16	NIST	mid-late afternoon
7.S.01	South	Broken Window	32	17-19	NIST	mid-late afternoon
7.S.01	South	Gash	32	19-20	NIST	mid-late afternoon
7.S.01	South	Burned-out	31	15-18	NIST	mid-late afternoon
7.S.01	South	Gash	31	19-20	NIST	mid-late afternoon
7.S.01	South	Burned-out	30	15-16	NIST	mid-late afternoon
7.S.01	South	Gash	30	19-20	NIST	mid-late afternoon
7.S.01	South	Burned-out	29	15-16	NIST	mid-late afternoon
8.N.01	North	Internal Fire / Broken Window	13	53-55	NIST	around 5:00PM +/-600s
8.N.01	North	Burned-out	12	54-57	NIST	around 5:00PM +/-600s
8.N.01	North	Internal Fire / Broken Window	12	57-1	NIST	around 5:00PM +/-600s
8.N.02	North	Internal Fire / Broken Window	11	48-50	GNA	est 5:00PM-5:09PM
8.N.03	North	Internal Fire / Broken Window	11	48-50	NIST	5:09:03PM +/-120s
8.N.04	North	Internal Fire / Broken Window	11	49-51	GNA	est 5:09PM-5:19PM
8.N.05	North	Internal Fire / Broken Window	11	50-52	NIST	5:19:45PM +/-120s
8.N.06	North	Internal Fire / Broken Window	11	49-52	NIST	5:20:17PM +/-15s
8.N.07	North	External Fire / Broken Window	13	54-55	NIST	likely few minutes before collapse

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**PHOTOGRAPHIC ANALYSIS:
VOLUME B
FIRE PROGRESSION BY LEVEL**

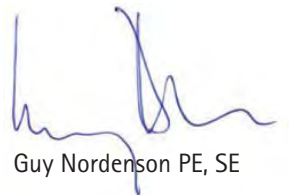
**WORLD TRADE CENTER 7
COLLAPSE INVESTIGATION
New York NY**

Prepared for

Gennet, Kallmann, Antin & Robinson PC
and
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16 December 2009

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JA-3760

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B.0 EXECUTIVE SUMMARY

This volume evaluates the fire-related photographic information for World Trade Center 7 on 11 September 2001 as it correlates to each individual floor level in the building. The analysis utilizes the images within *Volume A – Photographic Timeline* that contain the fire-related designations of smoke, broken window with internal fire, broken window with external fire, and burned-out. This information has been catalogued by floor level, and within each floor arranged in chronological order (see *Appendix 1B – Photographic Fire Index*). Such an organization allows the progression of individual fires to be tracked within the building throughout the day, from the collapse of World Trade Center 1 until the collapse of World Trade Center 7.

In order to provide detailed information regarding the behavior of each fire, this volume has been divided into sections pertaining to particular floor levels. Sections B.1 through B.6 correspond to levels 13, 12, 11, 9, 8, and 7 respectively, having sustained the most extensively documented fire damage within the visual evidence. Summaries of the fires located on each of these floors are given along with time sequences of its overall movement. Diagrams have also been constructed to better illustrate fire-related activity. These diagrams demonstrate which direction fires progressed, how long they may have resided in specific areas, and the extent to which the fires permeated each floor. Visual evidence illustrates that a handful of additional floors experienced fires that were less extensively documented, each of which are more generally covered in section B.7. For each level, conclusions are dependent upon the amount and type of data available. For instance, if only a limited number of images show a particular area of the building, it might be difficult to determine how long a fire remained in that location. In addition, as stated in *Volume A*, the photographs' times are understood to be approximate and subject to the accuracy of NIST's timing and the images containing metadata (see section A.0 in *Volume A* for additional information).

The information contained within this volume has been constructed based upon the photographs and corresponding times currently available and is subject to change in the event additional information is obtained.

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B.1 LEVEL 13 FIRE PROGRESSION

The visual evidence indicates a fire originated on level 13 at the eastern side of the building. The fire potentially traveled north along the east façade and then turned to move west along the north face. Photographs suggest that almost the entire east façade along with a majority of the north face experienced fire. Visual evidence for this level begins between 2:28pm and 3:10pm and spans until collapse. It can be estimated that the fire burned in the vicinity of column 79 (visible roughly between columns 36 and 45) from between 3:20pm or 3:40pm until approximately 4:00pm. See *Appendix 1B - Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figures 1.01 and 1.02 is as follows:

2:28PM

The first visual evidence of fire on this level occurs somewhere between 2:28pm and 3:10pm. Image 5.E.54 indicates flames at the central portion of the east façade.

3:20PM

Large flames on the east face near the north corner are visible in Image 6.E.02 timed between 3:20pm and 3:40pm. Additional smaller flames are also located at the southern end. It is difficult to discern their exact location, but smoke appears to fill the windows between both fires.

3:42PM

The first evidence of fire on the north face occurs in Images 6.N.11 to 6.N.13, all timed around 3:42pm. This fire is located near the eastern end. While the east façade is not visible in these images, the fire is shown in Figure 1.01 since the images most likely occurred within 20 minutes of one another.

3:55PM

Images for the next 10 to possibly 20 minutes, up to Image 6.N.23, show a fire moving west to the center of the north face.

4:15PM

Image 7.E.04, timed between 4:15pm and 4:38pm, reveals a fire still burning at the north corner of the east façade. At 4:38:14 +/- 1s Image 7.N.06 indicates that the fire at the eastern end of the north façade has burned-out; however buildings in this photograph block its progress to the west.

5:00PM

Around 5:00pm +/-600s Image 8.N.01 shows that the fire has reached column 55.

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5:20PM

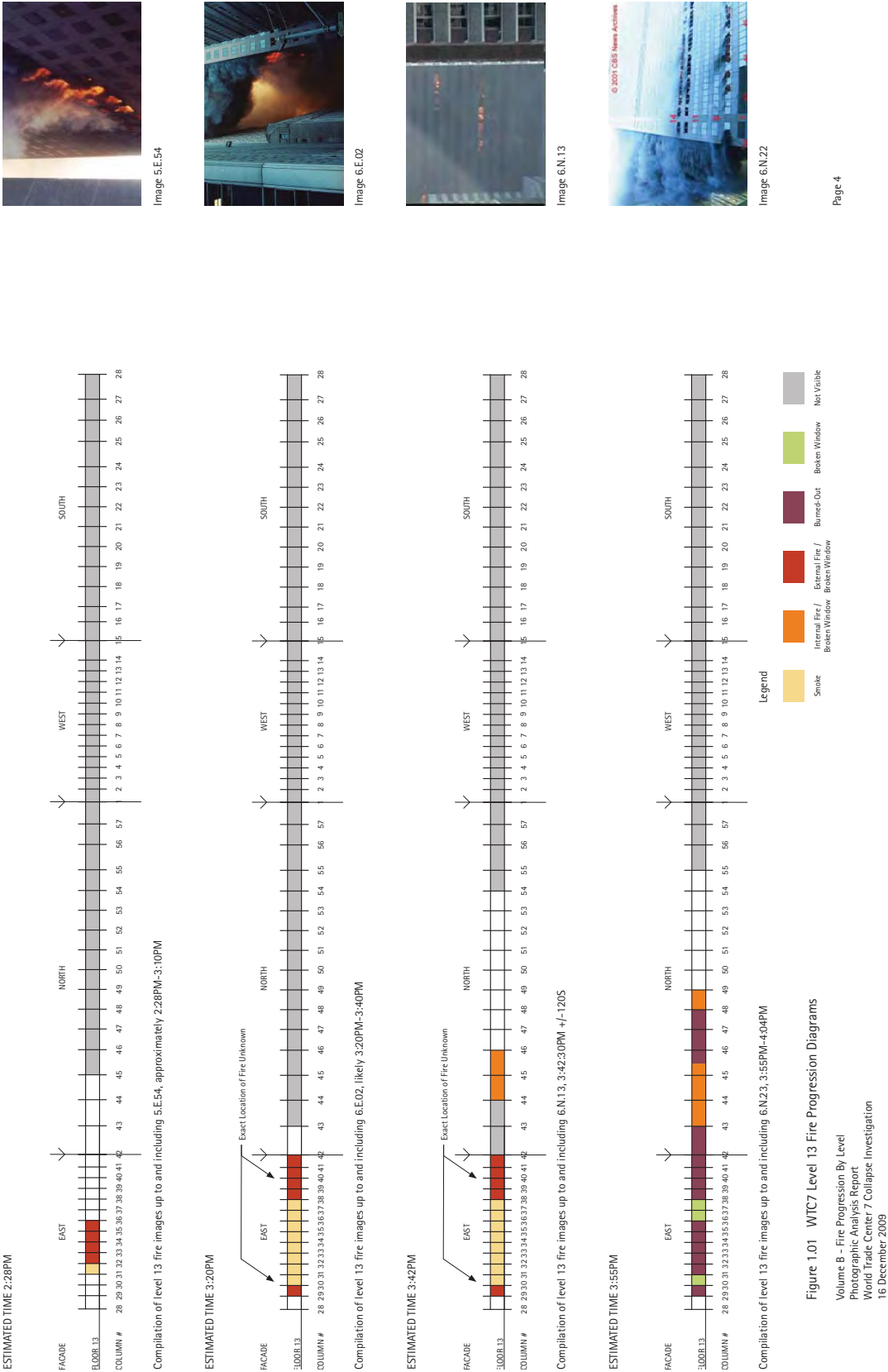
Image 8.N.07, taken shortly before collapse, shows very large flames emitted between columns 54 and 55.

B.1.1 Fire Progression and Fire Plan Diagrams

Fire progression Figures 1.01 and 1.02 on pages 4 and 5 depict the unfolded elevation of level 13 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.1 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 13 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

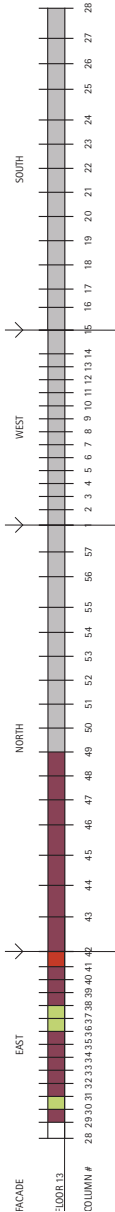
Fire plan Figure 1.03 on page 6 uses the same visual evidence to map where fire resided on level 13 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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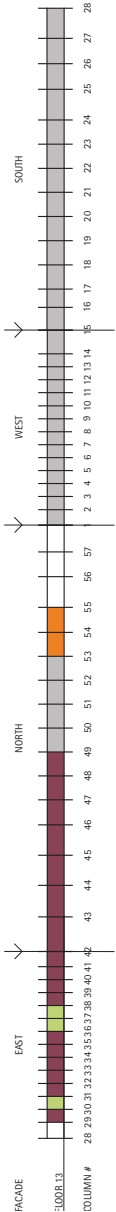
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ESTIMATED TIME 4:15PM



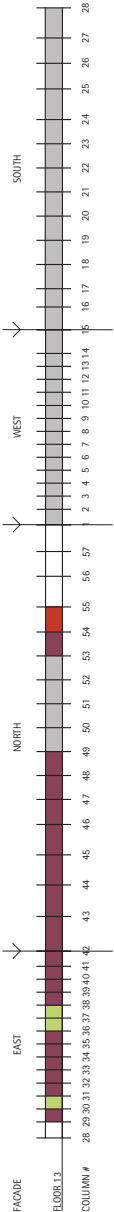
Compilation of level 13 fire images up to and including 7.E04, approximately 4:15PM-4:38PM

ESTIMATED TIME 5:00PM



Compilation of level 13 fire images up to and including 8.N.01, around 5:00PM +/-600S

ESTIMATED TIME 5:20PM



Compilation of level 13 fire images up to and including 8.N.07, likely a few minutes before collapse



Figure 1.02 WTC7 Level 13 Fire Progression Diagrams

Volume B - Fire Progression By Level
Photographic Analysis Report
World Trade Center 7 Collapse Investigation
16 December 2009



Image 7.E.04



Image 8.N.01



Image 8.N.07

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LEGEND

- Location of Burning Fire
- Location of Smoke, Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible
- See Note 3

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - The angle of images 6.E.01 and 6.E.02 makes determining the exact location of fire difficult. Locations indicated are approximate.
 - Images 6.E.03 (3:20PM-3:40PM) and 6.E.04 (3:20PM-3:40PM) show fire on the East facade possibly located between columns 38 and 42. Because of the photo's ambiguity, this fire has not been included.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 5.E.54 (2:28PM-3:10PM)	Image 6.E.02 (3:20PM-3:40PM)*
B	Image 6.E.01 (3:20PM-3:40PM)*	Image 6.E.02 (3:20PM-3:40PM)*
C	Image 6.E.01 (3:20PM-3:40PM)*	NA
D	Image 6.N.11 (3:20PM-3:54PM)	Image 6.N.22 (3:53PM-4:02PM) & Image 6.N.23 (3:55PM-4:04PM)
E	Image 6.N.15 (3:44PM)	NA
F	Image 6.N.15 (3:44PM)	Image 6.N.23 (3:55PM-4:04PM)
G	Image 6.N.17 (3:49PM-3:54PM) & Image 6.N.19 (3:51PM-3:58PM) & Image 6.N.21 (near 3:55PM)	NA
H	Image 7.E.03 (4:15PM-4:38PM)	Image 7.E.04 (4:15PM-4:38PM)
J	Image 8.N.01 (around 5:00PM)	NA
K	Image 8.N.01 (around 5:00PM)	Image 8.N.07 (like IV 5:20PM)



Within Timeframe A (Image 5.E.54)



Within Timeframes A & B (Image 6.E.02*)



Within Timeframe H (Image 7.E.04)



Within Timeframes J & K (Image 8.N.01)

Figure 1.03 WTC7 Level 13 Planometric Fire Progression Diagram

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B.2 LEVEL 12 FIRE PROGRESSION

Fire was first observed burning on level 12 at the south-central portion of the east face. The fire did not travel consistently along the face, but appears to have moved inward at locations. Skipping the northeast corner, fire next emerges slightly west along the north façade. From this position the fire appears to have spread both back to and around the northeast corner, while also continuing west along the north face eventually reaching the far northwest corner. Visual evidence of flames on this level begins at approximately 2:08pm and spans until around 5:00pm. It can be estimated that fire burned in the area of column 79 (visible roughly between columns 36 and 45) for approximately an hour. Because the evidence indicates that the fire spread internally around the northeast corner and then back along the perimeter, column 79 may have been heated more intensely than if the fire had remained solely at the perimeter. See *Appendix 1B - Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figures 2.01 and 2.02 is as follows:

1:30PM

The only indication that a fire may have burned on the west face comes from Image 4.W.10 taken somewhere between 1:30pm and 2:30pm. In this photograph smoke is emitted from a window near the center of the façade.

2:08PM

The first visual evidence of flames appears in images timed between 2:00pm and 2:08pm, with Image 5.E.08 definitively timed at 2:08:28pm +/- 1s. Fire is visible on the south and central portions of the east facade.

2:28PM

Fires continue to burn at the east face until at least 2:28pm. Images 5.E.09 to 5.E.53 track this progression.

2:57PM

The first evidence of fire on the north face is shown in Image 5.N.01 at 2:57pm +/- 300s a few column bays west of the corner. It does not appear that the fire turned the corner at the façade since the corner windows have not been broken and do not show fire behind. The fire instead is located further west along the north façade indicating that it most likely traveled internally.

3:10PM

Image 6.N.04 reveals that by 3:10pm +/- 300s the fire had spread both east and west simultaneously. The fire extended to the northeast corner and was again visible on the east face.

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3:41PM

Fire has reached the western half of the north face by 3:41pm +/-180s in Image 6.N.12. It appears the fire has been steadily traveling west for the preceding half hour.

4:15PM

Images indicate that the fire continued to burn in this vicinity for roughly the next 30 minutes. Fire is still visible in Image 7.N.02, likely taken at 4:15pm.

5:00PM

The last visual evidence of fire appears in Image 8.N.01 timed around 5:00pm. The fire has reached the most western column bay of the north façade.

B.2.1 Fire Progression and Fire Plan Diagrams

Fire progression Figures 2.01 and 2.02 on pages 9 and 10 depict the unfolded elevation of level 12 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.2 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 12 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

Fire plan Figure 2.03 on page 11 uses the same visual evidence to map where fire resided on level 12 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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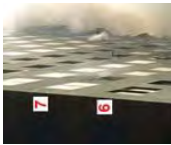
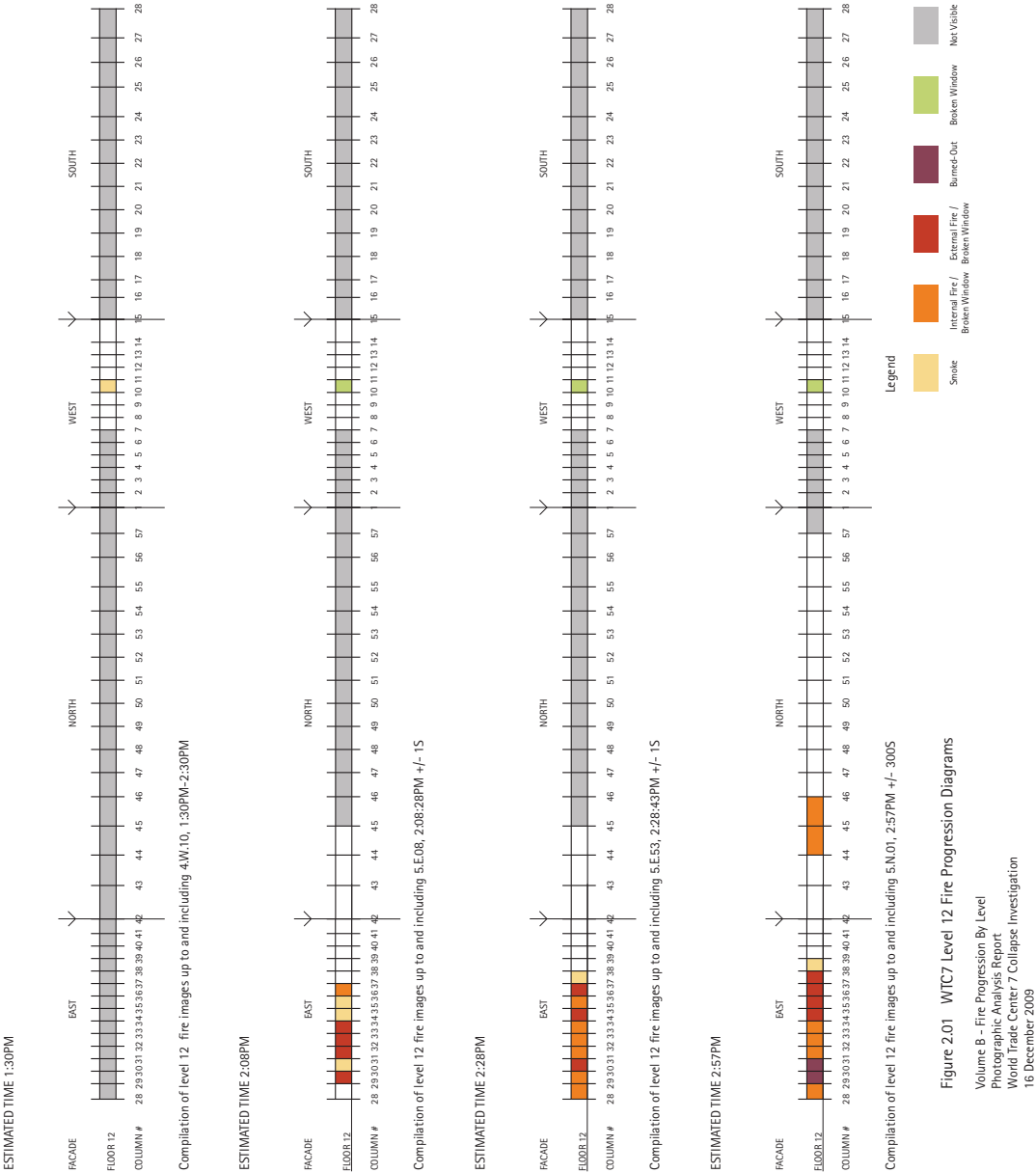


Image 4.W.10

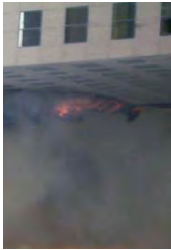


Image 5.E.08



Image 5.E.53

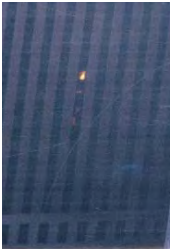


Image 5.N.01

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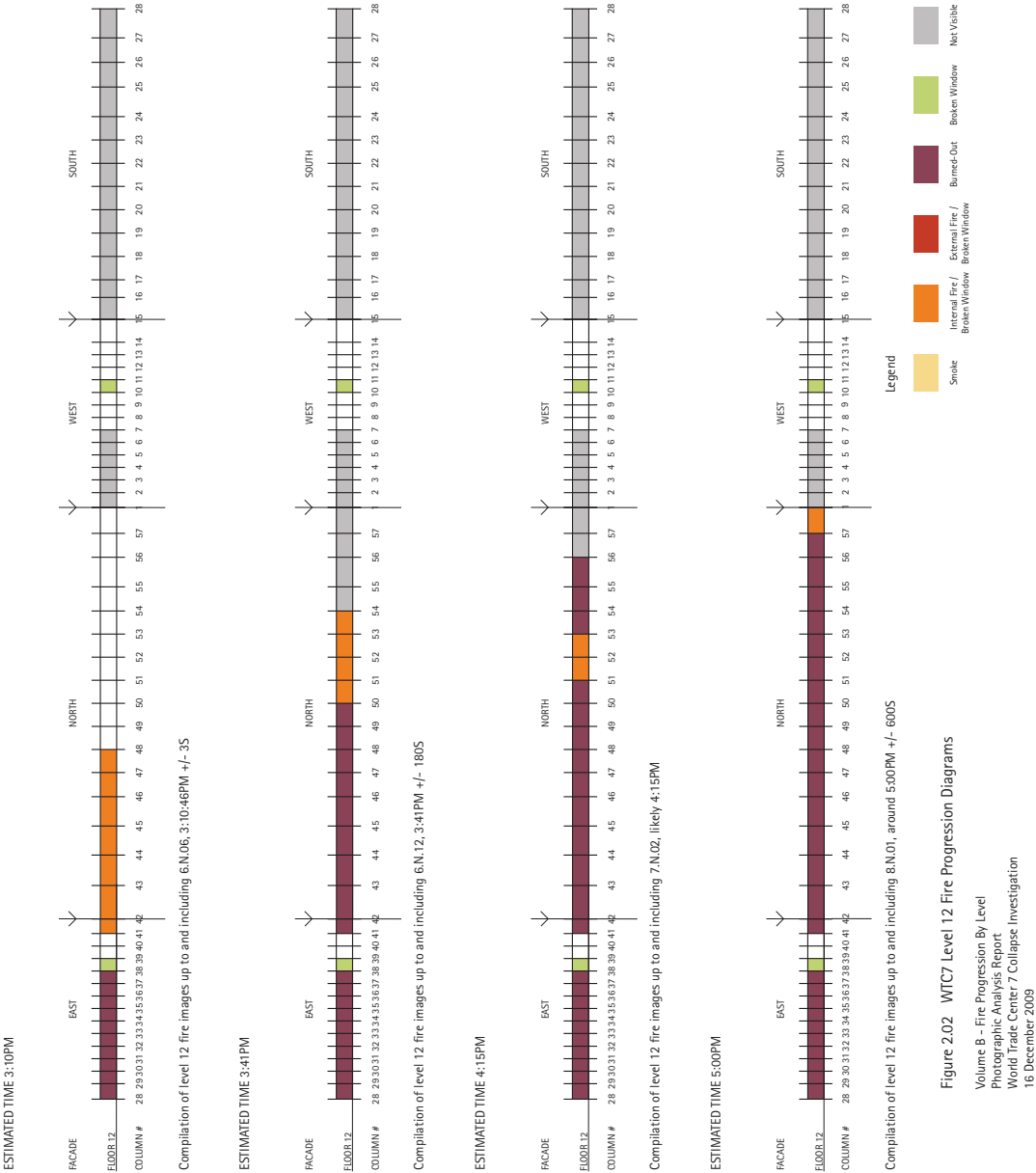


Image 6.N.04

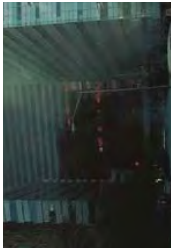


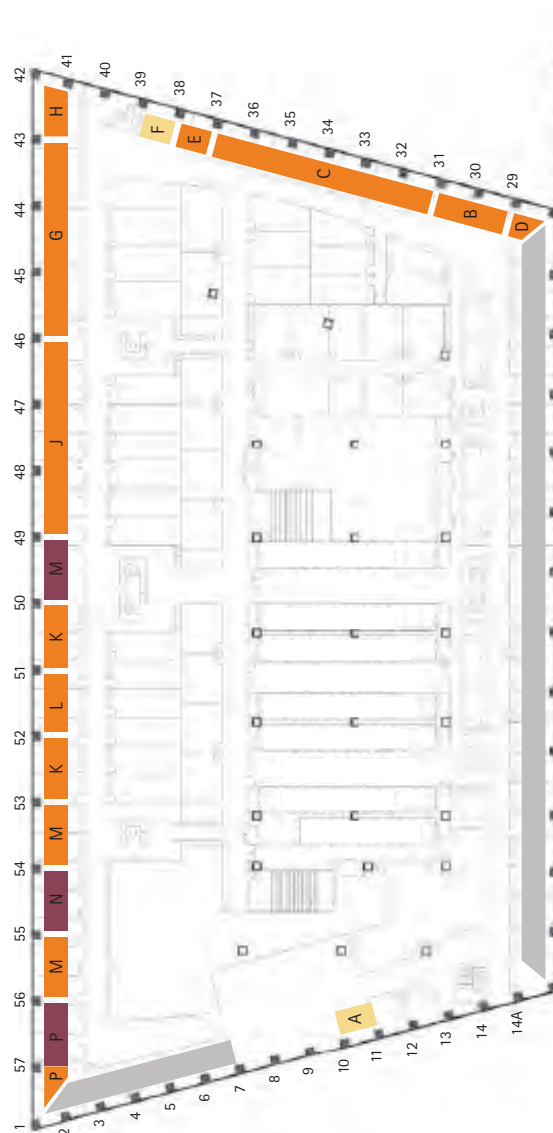
Image 6.N.12



Image 7.N.02



Image 8.N.01



JA-3772

LEGEND

- Location of Burning Fire
Location of Smoke; Burning Fire not shown
Location only shown as Burned-Out
Location Not Visible

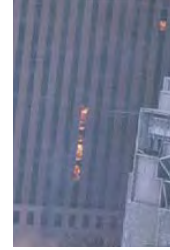
NOTES

- 1 Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
- 2 Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire, it has been designated as "burning fire." If a location is only ever visible with smoke or as burned-out it is designated accordingly.
- 3 Image 6.NJ2 (3:05PM-3:10PM) shows an orange glow on the East facade possibly located near column 40. Because of the photo's ambiguity, this potential fire has not been included.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 4.W.10 (1:30PM-2:30PM)	NA
B	Image 5.E.02 (2:00PM-2:08PM) & Image 5.E.02 (2:00PM-2:08PM) & Image 5.E.05 (2:00PM-2:08PM)	Image 5.E.53 (2:28PM)
C	Image 5.E.02 (2:00PM-2:08PM) & Image 5.E.08 (2:08PM)	Image 5.E.54 (2:28PM-3:10PM)
D	Image 5.E.21 (2:41PM)	Image 5.E.54 (2:28PM-3:10PM)
E	Image 5.E.27 (2:15PM-2:27PM)	Image 5.E.54 (2:28PM-3:10PM)
F	Image 5.E.54 (2:28PM-3:10PM)	NA
G	Image 5.N.01 (2:57PM) & Image 6.N.01 (3:05PM)	Image 6.N.04 (3:10PM) & Image 6.N.07 (3:10PM-3:13PM)
H	Image 6.N.02 (3:05PM-3:10PM) & Image 6.N.04 (3:10PM)	Image 6.N.05 (3:05PM-3:10PM)
J	Image 6.N.04 (3:10PM) & Image 6.N.06 (3:10PM) & Image 6.N.09 (3:12PM)	Image 6.N.10 (3:11PM-3:16PM)
K	Image 6.N.12 (3:41PM)	Image 6.N.16 (3:50PM) & Image 6.N.20 (3:54PM)
L	Image 6.N.12 (3:41PM)	Image 7.N.04 (4:16PM-4:38PM)
M	Image 6.N.12 (3:41PM) & Image 6.N.13 (3:42PM) & Image 6.N.15 (3:44PM)	NA
N	Image 6.N.21 (near 3:55PM)	NA
P	Image 8.N.01 (around 5:00PM)	NA



Within Timeframe A (Image 4.W.10)



Within Timeframe G (Image 6.N.01)

Figure 2.03 WTC7 Level 12 Planometric Fire Progression Diagram

Volume B – Fire Progression by Level
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B.3 LEVEL 11 FIRE PROGRESSION

Fire is first observed on level 11 burning at the east face. Evidence shows that this fire either dissipated or moved to the interior and then appeared at the perimeter again roughly ten to twenty minutes later. Very large, intense flames are visible in the last available image of fire burning on this face. It is not for another one and a half to two hours that fire is visible on this floor again, now on the north façade. After reaching the north face, the fire appears to have moved steadily westward for the next forty minutes until the building's collapse. Images show that the fire progressed to column 52, however, a building blocks whether it traveled further. Visual evidence of flames on this level begins at approximately 2:08pm and spans until collapse. Because of a lack of northeast corner images after 3:00pm the fire's path between the east and north faces cannot be determined. If the fire burned continuously, whether it had traveled along the perimeter or internally, it would have burned in the area of column 79 (visible roughly between columns 36 and 45) for roughly one and a half to two hours. See *Appendix 1B - Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figure 3.01 is as follows:

2:08PM

Images 5.E.02 to 5.E.16 taken between 2:00pm and 2:13pm are the first evidence indicating that a fire burned on this floor. Burn stains above two broken windows signify that flames had protruded from windows at the southern end of the east face and a glow suggests that the fire had moved inward. Images 5.E.17 to 5.E.29, timed between 2:13pm and 2:28pm, show these windows as burned-out indicating that the fire has either moved inside or died out. No additional windows have been broken during this time.

2:28PM

Subsequent photographs timed between 2:15pm and 2:28pm show fire reappearing at the perimeter, with Image 5.E.53 definitively timed at 2:28:43pm +/-1s. Fire has spread to 4 adjacent windows. In Image 5.E.54, estimated between 2:28pm and 3:10pm, the fire has enlarged and moved north two additional windows.

4:39PM

Fire is not visible within images on this floor again until 4:39pm. Images 7.N.06 and 7.N.07 both show a fire burning at the east-center portion of the north façade.

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5:20PM

By 5:09:03pm +/-120s Image 8.N.03 reveals that the fire has moved westward to the center section of the north façade. Image 8.N.06 taken at 5:20:17pm +/-15s confirms that the fire burned in this area until collapse, reaching column 52.

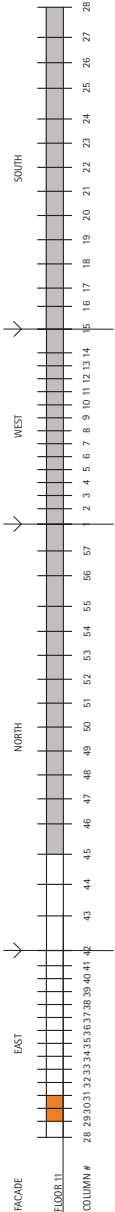
B.3.1 Fire Progression and Fire Plan Diagrams

Fire progression Figure 3.01 on page 14 depicts the unfolded elevation of level 11 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.3 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 11 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

Fire plan Figure 3.02 on page 15 uses the same visual evidence to map where fire resided on level 11 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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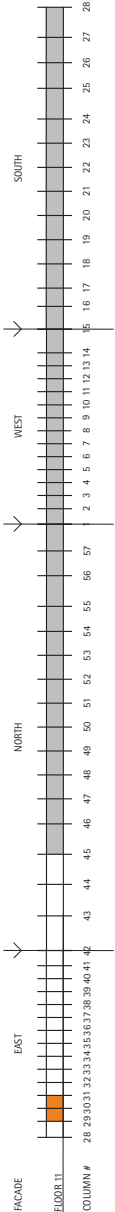
ESTIMATED TIME 2:08PM



Compilation of level 11 fire images up to and including 5.E.16, approximately 2:08PM-2:13PM

Image 5.E.14

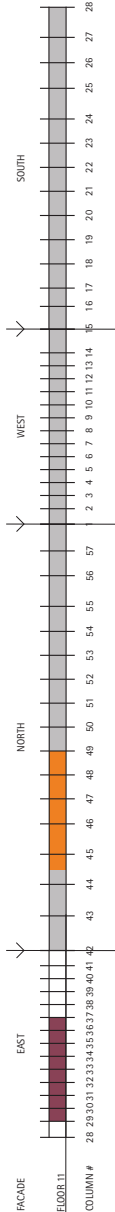
ESTIMATED TIME 2:28PM



Compilation of level 11 fire images up to and including 5.E.54, approximately 2:28PM-3:10PM

Image 5.E.54

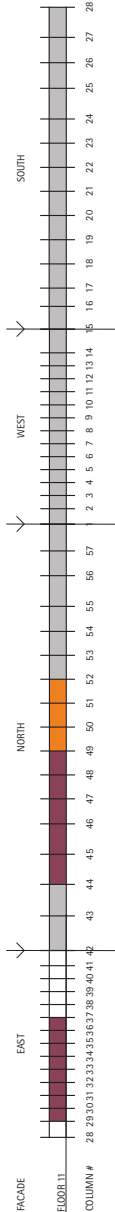
ESTIMATED TIME 4:39PM



Compilation of level 11 fire images up to and including 7.N.07, likely 4:39PM +/- 120S

Image 7.N.07

ESTIMATED TIME 5:20PM



Compilation of level 11 fire images up to and including 8.N.06, 5:20:17PM +/- 15S

Image 8.N.06



Figure 3.01 WTC7 Level 11 Fire Progression Diagrams
Volume B - Fire Progression By Level
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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.

FIRST VISUAL EVIDENCE OF FIRE

- A Image 5.E.02 (2:00PM-2:08PM)
- B Image 5.E.30 (2:15PM-2:28PM) & Image 5.E.32 (2:15PM-2:28PM) & Image 5.E.33 (2:15PM-2:28PM)
- C Image 5.E.54 (2:28PM-3:10PM)
- D Image 7.N.06 (4:38PM) & Image 7.N.07 (likely 4:39PM)
- E Image 7.N.07 (likely 4:39PM)
- F Image 8.N.02 (5:00PM-5:09PM)
- G Image 8.N.04 (5:09PM-5:19PM)
- H Image 8.N.06 (5:20PM)



Within Timeframes B & C (Image 5.E.54)

LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE

- Image 5.E.39 (2:15PM-2:28PM) & Image 5.E.50 (2:15PM-2:28PM)
- Image 5.E.54 (2:28PM-3:10PM)
- NA
- NA
- Image 8.N.02 (5:00PM-5:09PM)
- Image 8.N.06 (5:20PM)
- Image 8.N.06 (5:20PM)
- NA



Within Timeframe D & E (Image 7.N.07)



Within Timeframe F & G (Image 8.N.04)



Within Timeframe F, G, & H (Image 8.N.06)

Figure 3.02 WTC7 Level 11 Planometric Fire Progression Diagrams
Volume B - Fire Progression by Level
Photographic Analysis Report
World Trade Center 7 Collapse Investigation
16 December 2009

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B.4 LEVEL 9 FIRE PROGRESSION

Fires are not seen on level 9 until nearly 4:00pm when the visual evidence shows a fire burning at the western end of the north face. This fire appears to have burned for roughly forty minutes as it moved east along the façade. While an image shows the fire reaching the east face, it is not known how long it resided in the area or whether it traveled south from the corner. Visual evidence of fire on this level ends at 4:39pm. Due to this limited information it is difficult to establish how column 79 may have been affected. From this evidence it might be broadly estimated that the fire have burned in the vicinity of column 79 (visible roughly between columns 36 and 45) for approximately twenty-five minutes. See *Appendix 1B - Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figure 4.01 is as follows:

3:55PM

The first visual evidence of fire occurs near 3:55pm in Image 6.N.21 on the north face near the western end. It is unknown how far west this fire extends since a building in the foreground obscures the remaining facade.

4:10PM

Images 7.N.01 and 7.N.02, taken at 4:10pm +/-300s and around 4:15pm respectively, show this fire growing and moving to the east. The fire between columns 54 and 55 is not visible in these images, but has been shown in Figure 4.01 since the images most likely were taken within 20 minutes of one another.

4:15PM

Image 7.E.04, estimated between 4:15pm and 4:38pm, shows that fire had reached the northeast corner on the east façade.

4:39PM

By approximately 4:39pm, Images 7.N.05 to 7.N.07 indicate that the fire had died down to small, dispersed spot fires at the eastern side of the north face. The fire at the northeast corner is still shown burning in Figure 4.01 since the images most likely were taken within 20 minutes of one another.

B.4.1 Fire Progression and Fire Plan Diagrams

Fire progression Figure 4.01 on page 18 depicts the unfolded elevation of level 9 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.4 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 9 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

Fire plan Figure 4.02 on page 19 uses the same visual evidence to map where fire resided on level 9 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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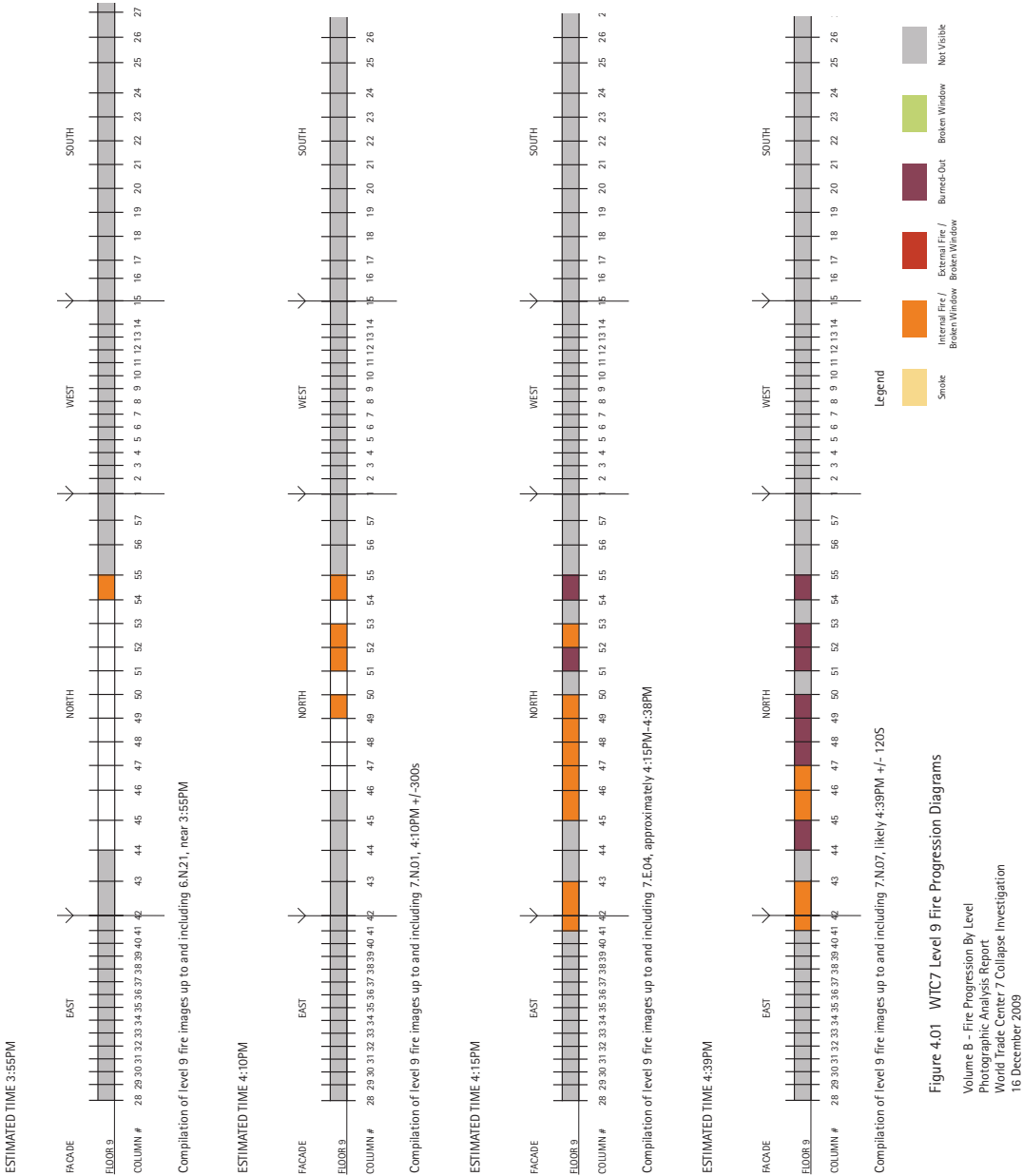


Image 6.N21



Image 7.N01



Image 7.E04



Image 7.N07

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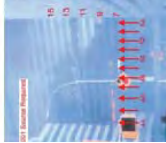


LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 6.N.21 (near 3:55PM)	NA
B	Image 7.N.01 (4:10PM)	NA
C	Image 7.N.01 (4:10PM)	Image 7.N.03 (4:15PM-4:38PM)
D	Image 7.N.02 (likely 4:15PM)	Image 7.N.03 (4:15PM-4:38PM) & Image 7.N.04 (4:15PM-4:38PM)
E	Image 7.N.02 (likely 4:15PM)	Image 7.N.07 (likely 4:39PM)
F	Image 7.E.03 (4:15PM-4:38PM)	Image 7.E.04 (4:15PM-4:38PM)
G	Image 7.N.05 (4:38PM)	NA



Within Timeframe A (Image 6.N.21)



Within Timeframes B & C (Image 7.N.03)



Within Timeframe F (Image 7.E.04)



Within Timeframe G (Image 7.N.05)

Figure 4.02 WTC7 Level 9 Planometric Fire Progression Diagrams
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B.5 LEVEL 8 FIRE PROGRESSION

Flames are first observed on level 8 at the central portion of the north face. However, a subsequent image shows that fire has already spread from the northwest corner and that a fire continues to burn along the west façade. This indicates that the fire most likely started somewhere in the western portion of the building and split into two separate fires, one traveling east along the north façade and the other burning along the west face. The fire traveled the entire length of the north facade. There is evidence that it was also able to reach the east face, though exactly how far south it spread along the façade is difficult to discern. Visual evidence of flames on this level begins at 3:42pm and spans until 4:39pm. It can be estimated that the fire burned in the vicinity of column 79 (visible roughly between columns 36 and 45) for approximately forty minutes. See *Appendix 1B - Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figures 5.01 and 5.02 is as follows:

3:20PM

Within Images 6.E.01 to 6.E.04, judged to have been taken somewhere between 3:20pm and 3:40pm, dark smoke pours from windows at the northeast corner of the north façade. The location of the smoke's source is unknown since there is no evidence of fire on floor 8 prior to this image and actual flames are not visible within the photographs.

3:42PM

The first visual evidence of flames occurs simultaneously on the north and west façades in Images 6.W.32, 6.N.12, 6.N.13, and 6.N.14. Each of these photographs is timed in the vicinity of 3:42pm. The fire on the north face extends across an area roughly equal to a third of the façade from column lines 47 to 52. The windows west of the fire have already burned-out. Smoke and flames are also both visible on the northern portion of the western face.

3:49PM

Images 6.N.15 to 6.N.18 show that for the next 10 to 15 minutes fire steadily traveled toward the northeast corner. These images range from 3:44pm to 3:54pm and confirm that fire reached every window on the façade except for the most eastern.

3:55PM

The first evidence of fire on the east façade occurs in Images 6.N.23 and 6.N.24 both taken between 3:55pm and 4:04pm. Flames only appear in the northernmost window.

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4:15PM

Image 7.N.02, likely taken at 4:15pm, exhibits that the fire on the northern façade is still burning. The status of fire between columns 43 and 45 is unknown because the area is not shown in any of the images attributed to this time-frame. Figure 5.02 shows this area with internal flames since the 20 minute standard time-frame has not been exceeded and the areas directly to the west are still burning. Large flames are visible along the east façade in Image 7.E.04 judged to have been taken between 4:15pm and 4:38pm. It is difficult to discern their exact location but they appear to be located in the southern half of the facade.

4:39PM

The last visual evidence of fire on this level appears in Image 7.N.07 taken at 4:39pm +/-120s. Fire is still perceptible between column lines 45 and 47, though it has dissipated. While the east façade is not visible in this image, the fire is shown in Figure 5.02 since the images most likely occurred within 20 minutes of one another.

B.5.1 Fire Progression and Fire Plan Diagrams

Fire progression Figures 5.01 and 5.02 on pages 22 and 23 depict the unfolded elevation of level 8 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.5 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 8 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

Fire plan Figure 5.03 on page 24 uses the same visual evidence to map where fire resided on level 8 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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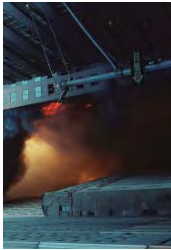
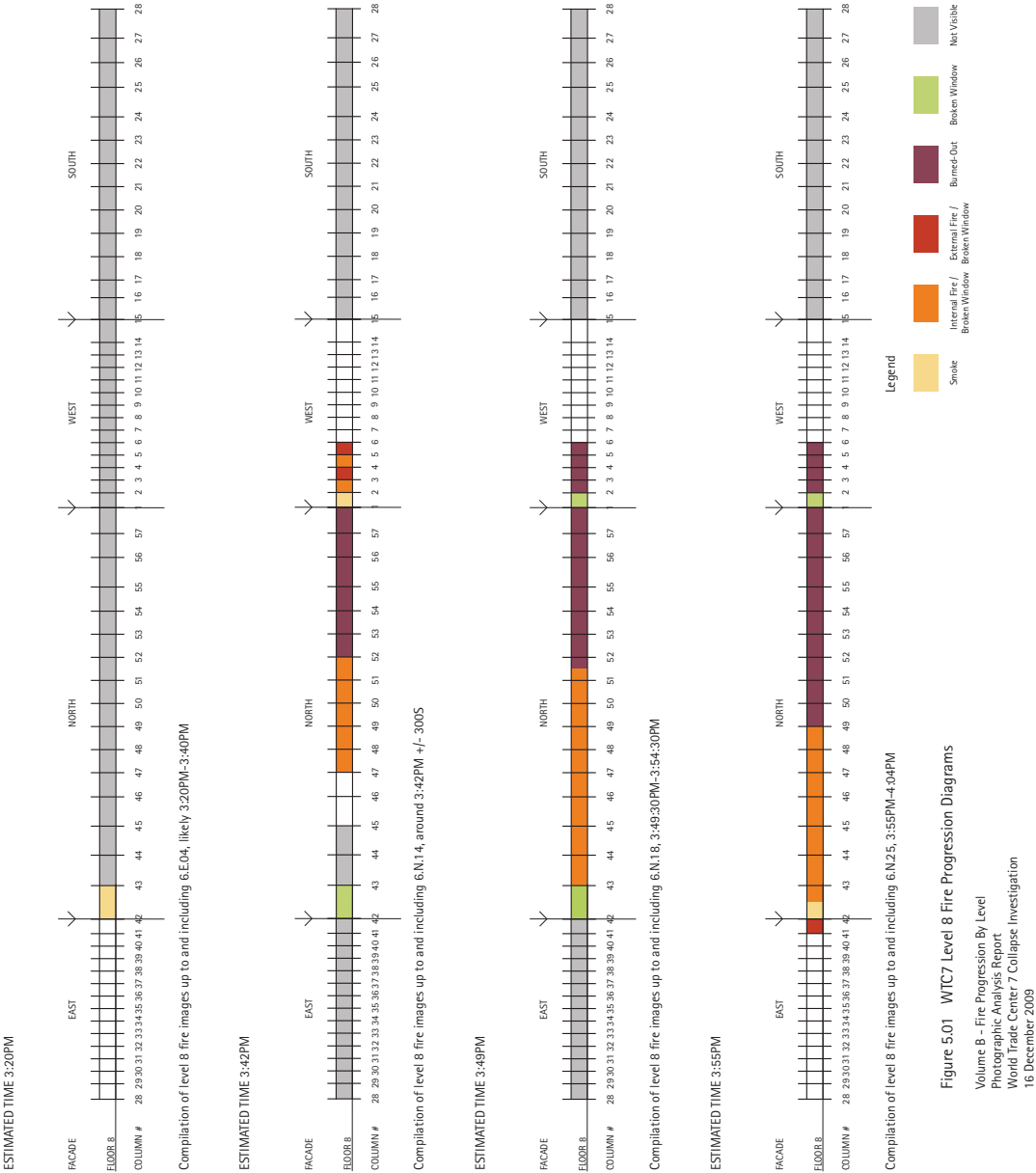


Image 6.E.02



Image 6.N.14



Image 6.N.17



Image 6.N.23

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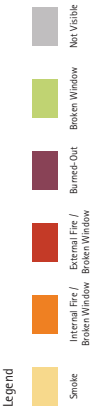
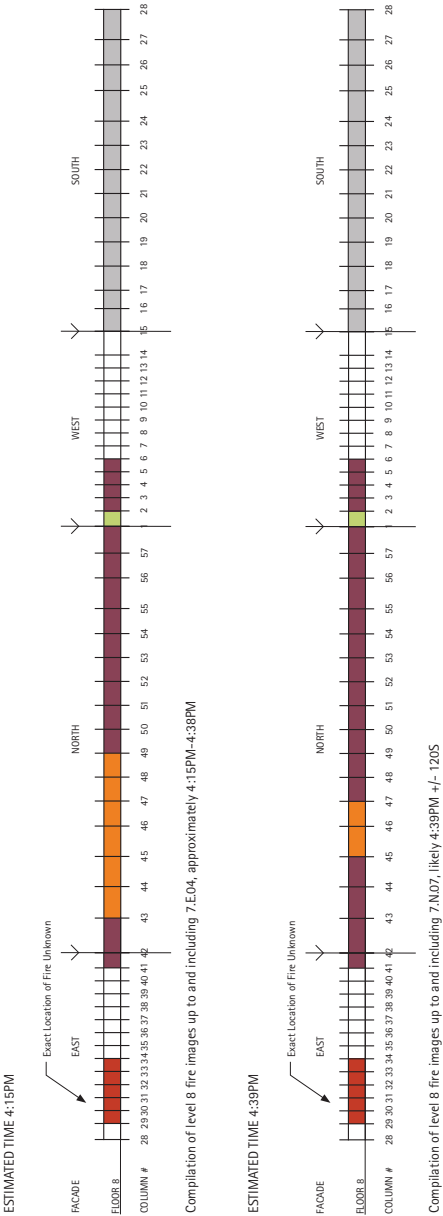


Figure 5.02 WTC7 Level 8 Fire Progression Diagrams

Volume B - Fire Progression By Level

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Image 7.E04



Image 7.N07

Guy Nordenson and Associates



LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible
- * See Note 3

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - The angle of Image 7.E04 makes determining the exact location of fire difficult. Locations indicated are approximate.

Figure 5.03 WTC7 Level 8 Planometric Fire Progression Diagrams

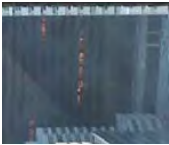
Volume B - Fire Progression by Level
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FIRST VISUAL EVIDENCE OF FIRE

- A Image 6.E01 (3:20PM-3:40PM)
- B Image 6.W32 (3:41PM) &
Image 6.N12 (3:41PM) &
Image 6.N14 (around 3:42PM)
- C Image 6.N12 (3:41PM)
- D Image 6.N12 (3:41PM)
- E Image 6.N16 (3:50PM) &
Image 6.N17 (3:49PM-3:54PM)
- F Image 6.N17 (3:49PM-3:54PM)
- G Image 6.N23 (3:55PM-4:04PM)
- H Image 7.E04 (4:15PM-4:38PM)*



Within Timeframe A (Image 6.E02)



Within Timeframe E (Image 6.N.16)

LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE

- Image 6.N25 (3:55PM-4:04PM)
- NA
- Image 6.N20 (3:54PM) &
Image 6.N21 (near 3:55PM)
- Image 7.N01 (4:10PM) &
Image 7.N02 (likely 4:15PM)
- Image 7.N07 (likely 4:39PM)
- Image 6.N25 (3:55PM-4:04PM)
- Image 6.N25 (3:55PM-4:04PM)
- NA



Within Timeframe B (Image 6.N.14)



Within Timeframe G (Image 6.N.23)

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B.6 LEVEL 7 FIRE PROGRESSION

The visual evidence indicates that a fire most likely started on level 7 along the west face and traveled north. It appears that the fire turned the northwest corner and continued moving east along the north face. After reaching column 47 the fire appears to have stalled, or possibly moved inward out of view. Later photographs do confirm that fire reached almost every window on the north façade, save for the most eastern two column bays. Because images show fire on the east façade later in the day it might be assumed that the fire internally skipped this portion of the northeast corner. The exact location of the fire along the east is unknown because of the image's limited visibility. Visual evidence for this level begins between 1:30pm and 2:30pm and spans until 4:39pm. Since the fire does not appear at the perimeter for a large amount of time it could possibly be assumed that it was burning internally. If the fire burned continually within the interior portions of the building it might be estimated that it burned in the vicinity of column 79 (visible roughly between columns 36 and 45) for approximately an hour. However, this cannot be verified due to a lack of supporting visual evidence. See *Appendix 1B – Photographic Fire Index* for a catalogue of all fire activity related to this level.

An abbreviated timeline that corresponds to Figures 6.01 and 6.02 is as follows

1:30PM

Indication that a fire burned at the west face comes from Images 4.W.10 to 4.W.13 taken between 1:30pm and 2:30pm. In these photograph smoke is emitted from several windows near the north and central portions of the façade. Two windows south of this area also appear to possess burn stains indicating a fire had previously burned at the face and was moving north.

2:21PM

Image 5.W.07, taken at 2:21:10pm, indicates that a fire has reached the northwest corner and most likely continued east along the north façade. The windows between columns 56 and 1 have already burned-out. A small amount of smoke emitted from the west face signals that a fire still lingers in the area.

2:57PM

The first visual evidence of flames appears in Image 5.N.01 taken at 2:57pm +/-300s. This photograph shows fire along nearly the entire western half of the north façade.

3:12PM

Images 6.N.01 to 6.N.09 indicate that this fire continued to spread eastward to column 47.

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3:41PM

At 3:41pm +/-180s Image 6.N.12 shows that the fire has burned-out all windows to column 47. Since buildings block the remaining eastern portion of the north face in images at this time, it is impossible to know exactly where the fire is located.

4:15PM

Image 7.E.04, likely taken between 4:15pm and 4:38pm, shows that the fire at the east face has moved southward and grown in intensity. It is difficult to discern the exact location of the flames, but they appear to be in the southern half of the facade. The fire on the north façade is still shown as burning in Figure 6.02 since subsequent images still contain this fire.

4:39PM

The last photographs, Images 7.N.05 and 7.N.07, of fire on this floor show small spot fires on the north façade at approximately 4:39pm. Figure 6.02 retains the fire on the east façade since the images most likely were taken within 20 minutes of one another.

B.6.1 Fire Progression and Fire Plan Diagrams

Fire progression Figures 6.01 and 6.02 on pages 28 and 29 depict the unfolded elevation of level 7 and map the progression of fire as it traveled the floor's perimeter throughout the day. These diagrams only include fire-related information, omitting any debris damage for clarity. Each elevation is shown at consecutive times during the day to clearly illustrate the fire's movement (see section B.6 for a description of this timeline). These successive elevations retain previous information, providing a compilation of all the images with information pertaining to level 7 up until the stated time (see *Appendix 1B - Photographic Fire Index* for a catalogue of fire information organized by level). When a fire is visible in one image, but the area is not visible in subsequent photographs, a judgment has been made as to whether the fire should be shown as still burning or burned-out from diagram to diagram. Generally 20 minutes, the standard time a typical office fire burns in a given area, was used as the basis for assessment. In regards to smoke, if smoke is observed once but the area is not visible again, the window is subsequently shown as broken since it is not known whether a fire actually came to the perimeter or remained on the interior.

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Fire plan Figure 6.03 on page 30 uses the same visual evidence to map where fire resided on level 7 in plan in order to better understand how the fire moved in relation to the architectural layout of the floor. This diagram focuses upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagram does not attempt to speculate on how a fire may have moved within the interior spaces.

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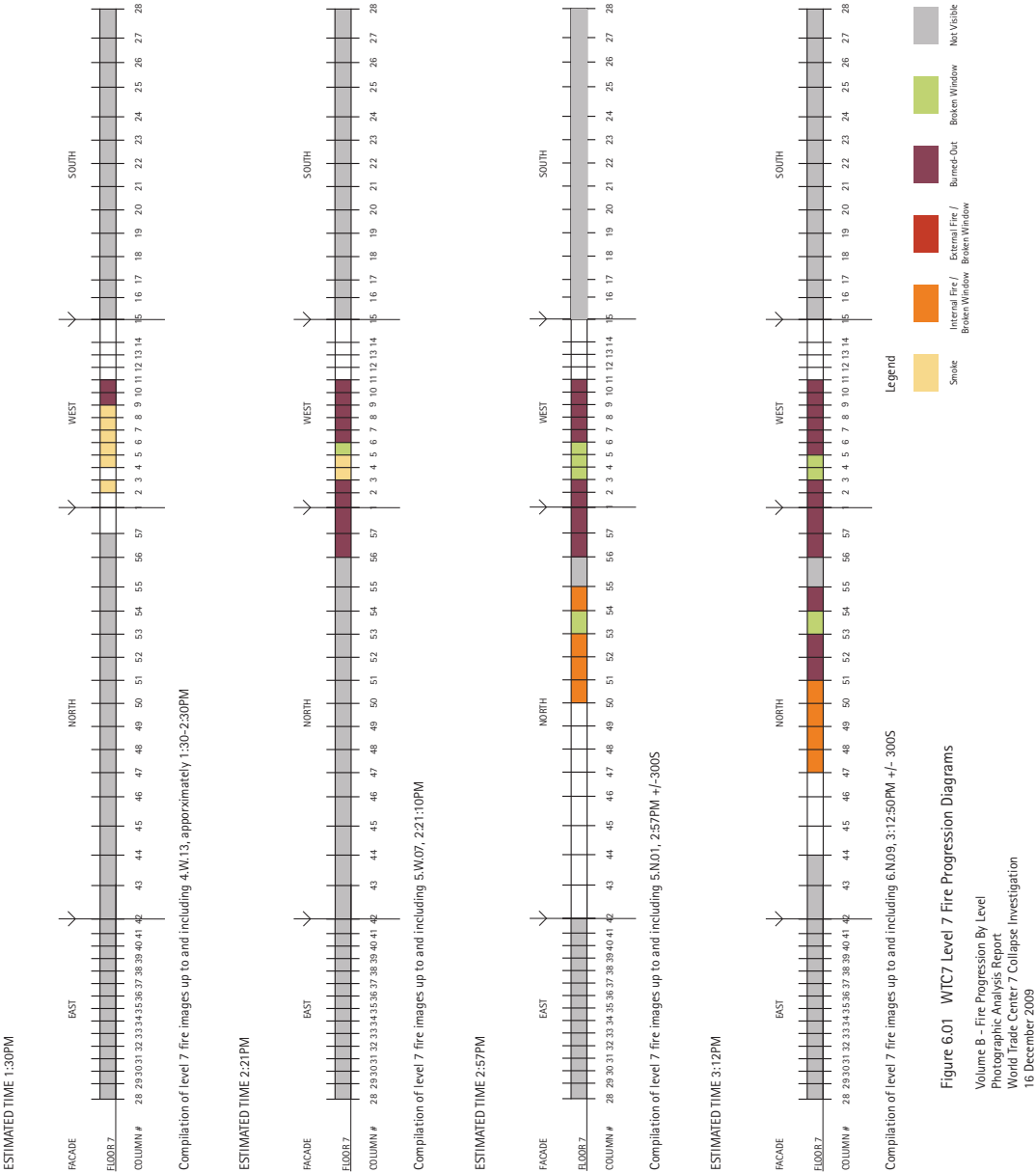


Image 4.W10



Image 5.W07



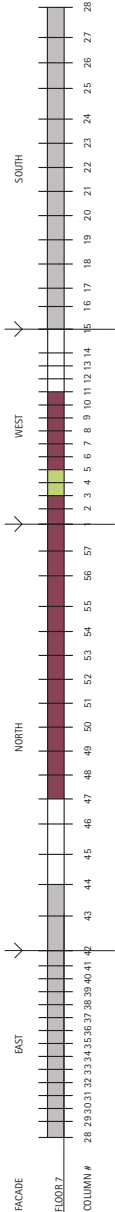
Image 5.N01



Image 6.N09

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ESTIMATED TIME 3:41PM

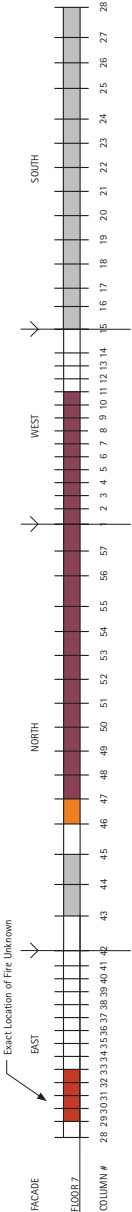


Compilation of level 7 fire images up to and including 6.N12, 3:41PM +/- 180S



Image 6.N.12

ESTIMATED TIME 4:15PM

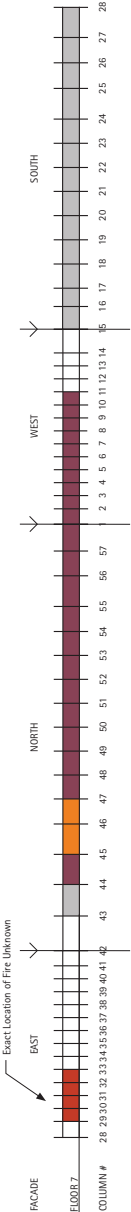


Compilation of level 7 fire images up to and including 7.E04, approximately 4:15PM-4:38PM



Image 7.E.04

ESTIMATED TIME 4:39PM



Compilation of level 7 fire images up to and including 7.N07, likely 4:39PM +/- 120S

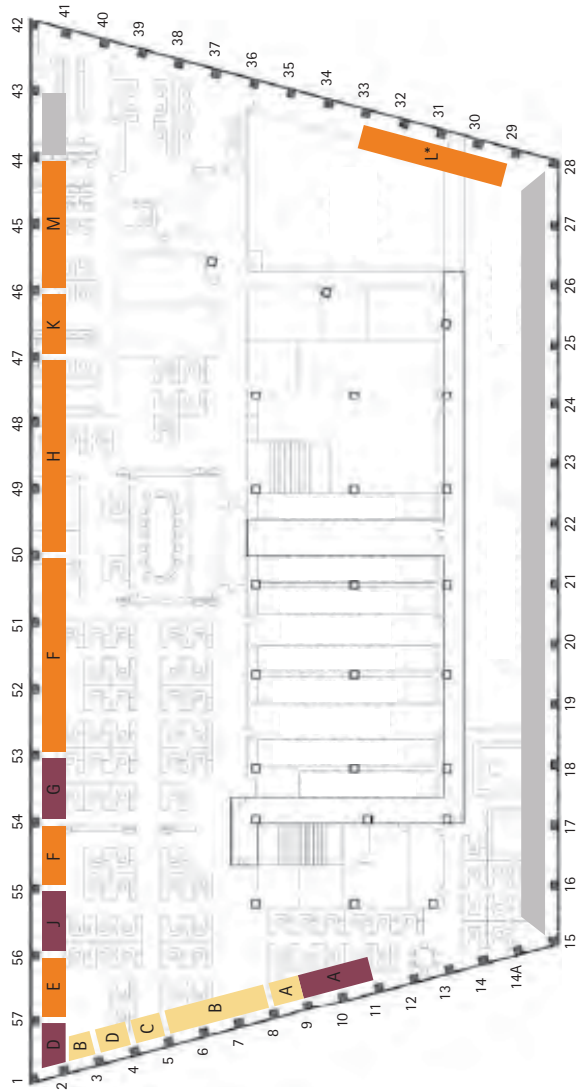


Image 7.N.07



Figure 6.02 WTC7 Level 7 Fire Progression Diagrams
Volume B - Fire Progression By Level
Photographic Analysis Report
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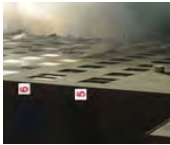


LEGEND

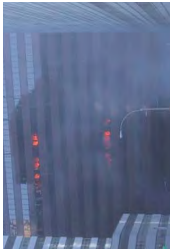
- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible
- * See Note 3

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - The angle of Image 7.E04 makes determining the exact location of fire difficult. Locations indicated are approximate.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 4.W.10 (1:30PM-2:30PM)	NA
B	Image 4.W.10 (1:30PM-2:30PM)	Image 4.W.12 (1:30PM-2:30PM)
C	Image 4.W.13 (1:30PM-2:30PM)	Image 5.W.07 (2:21PM)
D	Image 5.W.07 (2:21PM)	NA
E	Image 5.W.07 (2:21PM)	Image 6.N.03 (3:05PM-3:10PM)
F	Image 5.N.01 (2:57PM)	Image 6.N.02 (3:05PM-3:10PM) Image 6.N.03 (3:05PM-3:10PM) Image 6.N.05 (3:05PM-3:10PM) Image 6.N.09 (3:12PM)
G	Image 6.N.02 (3:05PM-3:10PM)	Image 6.N.03 (3:05PM-3:10PM)
H	Image 6.N.01 (3:05PM) & Image 6.N.05 (3:05PM-3:10PM) & Image 6.N.06 (3:10PM)	Image 6.N.09 (3:12PM)
J	Image 6.N.14 (around 3:42PM)	NA
K	Image 7.N.02 (likely 4:15PM)	Image 7.N.07 (likely 4:39PM)
L	Image 7.E04 (4:15PM-4:38PM)*	NA
M	Image 7.N.05 (4:38PM)	NA



Within Timeframe A (Image 4.W.10)



Within Timeframes F & H (Image 6.N.09)

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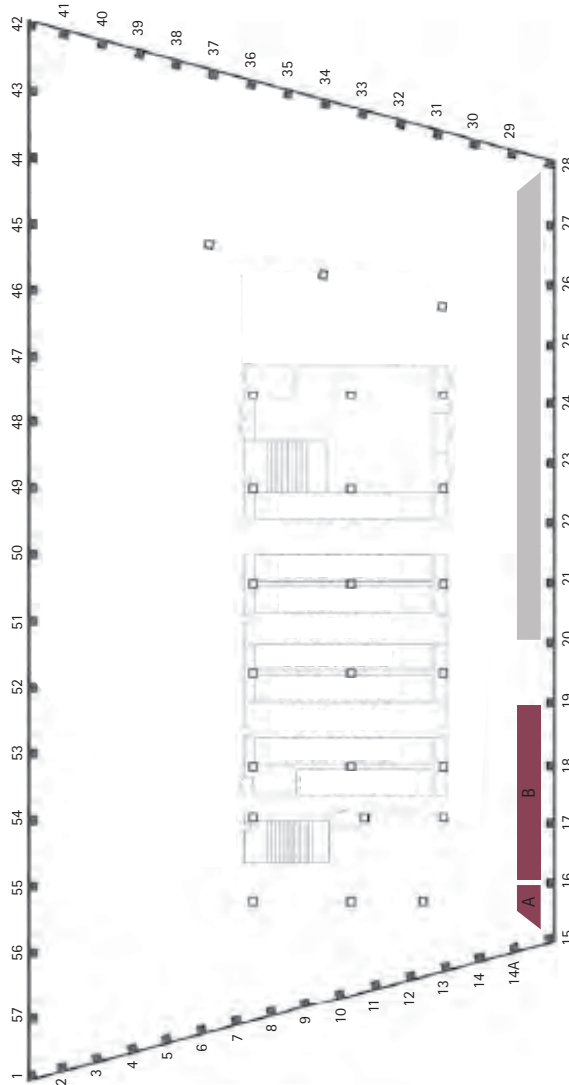
B.7 FIRE PROGRESSION AT ADDITIONAL LEVELS

While the visual evidence shows that the most severe fires occurred on levels 13, 12, 11, 9, 8, and 7, a number of other floors also sustained fire-related damage. There is evidence of smoke, burning fire, and/or burned-out windows on levels 5 to 6, 17 to 19, 21 to 23, and 29 to 33. While not as extensive as the six principal levels with fire, the locations of fire-related damage has been catalogued for these additional floors in Figures 7.01 to 7.13.

B.7.1 Fire Plan Diagrams

Fire plan Figures 7.01 to 7.13 on pages 33 to 45 illustrate the extent of fire-related damage for the less fire damaged floors. These diagrams use the visual evidence for each level to map where fire resided in plan in order to better understand where the fire burned in relation to the architectural layout of the floor. Where specific architectural information for a particular level is unavailable, only the perimeter and core layouts are shown. These diagrams focus upon the duration that a fire resided within a given area, outlining the first and last images available, along with the image's corresponding timestamp, for each location. The type of fire-related damage, either burning fire, smoke, or burned-out, is also specified. Because the visual evidence only establishes fire at the perimeter, the diagrams do not attempt to speculate on how a fire may have moved within the interior spaces.

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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - Floor plan shown blank due to insufficient information.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 5.S.02 (after 2:00PM)	NA
B	Image 5.W.05 (2:00PM-3:00PM)	NA



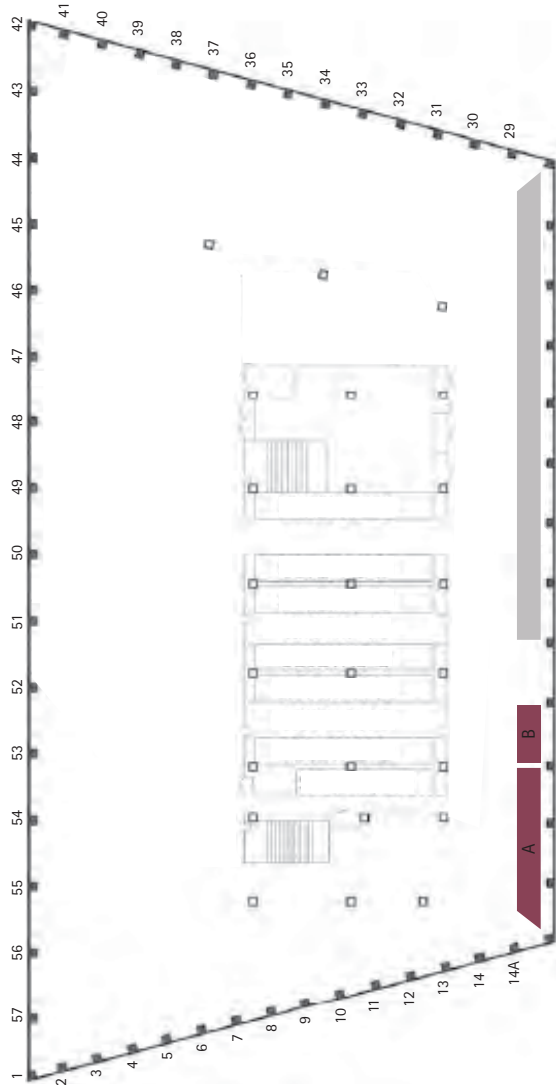
Within Timeframe A (Image 5.S.02)



Within Timeframe B (Image 5.W.05)

Figure 7.01 WTC7 Level 33 Planometric Fire Progression Diagram
Volume B - Fire Progression by Level
Photographic Analysis Report
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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - Floor plan shown blank due to insufficient information.

LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE

- NA
- NA

FIRST VISUAL EVIDENCE OF FIRE

- A Image 5.W.05 (2:00PM-3:00PM)
Image 5.W.09 (2:00PM-3:30PM)
- B Image 5.S.02 (after 2:00PM)



Within Timeframe A (Image 5.W.09)



Within Timeframe B (Image 5.S.02)

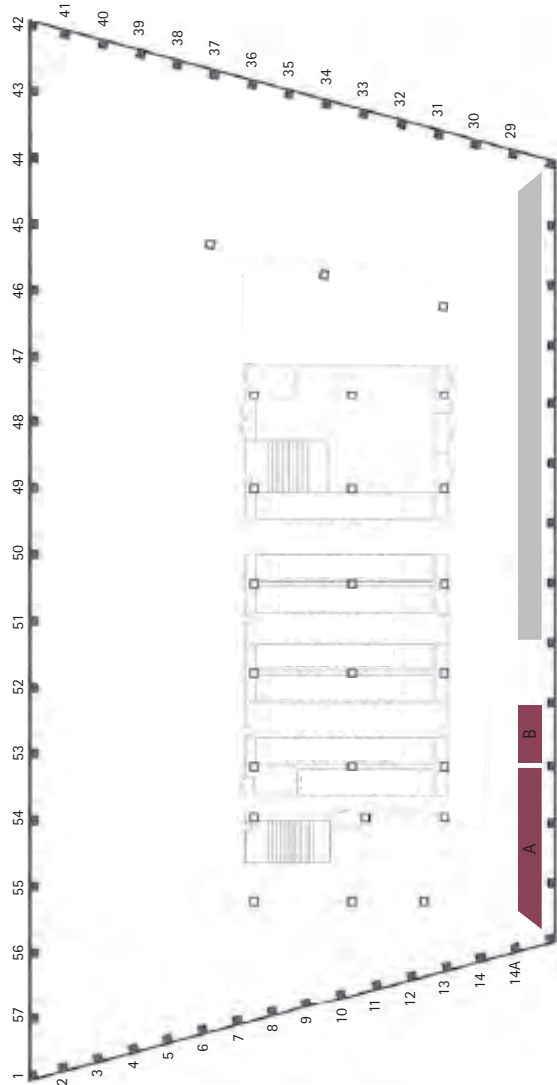


Within Timeframe A (Image 5.W.05)

Figure 7.02 WTC7 Level 32 Planometric Fire Progression Diagram

Volume B - Fire Progression by Level
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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - Floor plan shown blank due to insufficient information.

LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE

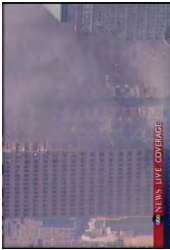
- NA
- NA

FIRST VISUAL EVIDENCE OF FIRE

- A Image 5.W.05 (2:00PM-3:00PM)
Image 5.W.09 (2:00PM-3:30PM)
- B Image 5.S.02 (after 2:00PM)



Within Timeframe A (Image 5.W.09)



Within Timeframe B (Image 5.S.02)

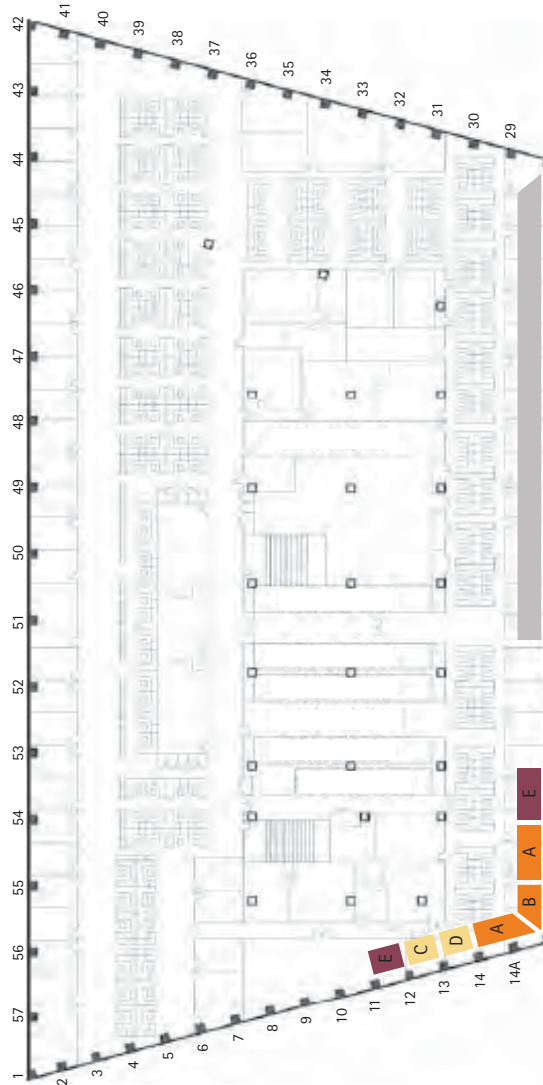


Within Timeframe A (Image 5.W.05)

Figure 7.03 WTC7 Level 31 Planometric Fire Progression Diagram

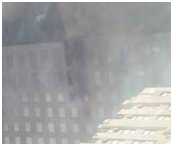
Volume B - Fire Progression by Level
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JA-3796

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 3.W.06 (12:27PM) Image 3.W.09 (12:28PM)	Image 3.W.12 (12:28PM) Image 3.W.14 (12:28PM-12:32PM) Image 3.W.18 (12:33PM)
B	Image 3.W.08 (12:27PM-12:28PM)	Image 3.W.22 (12:30PM-1:00PM)
C	Image 3.W.15 (12:28PM-12:32PM)	NA
D	Image 3.W.15 (12:28PM-12:32PM)	Image 3.W.16 (12:28PM-12:32PM)
E	Image 5.W.04 (2:00PM-3:00PM) Image 5.W.09 (2:00PM-3:30PM)	NA



Within Timeframe A (Image 3.W.09)



Within Timeframe B (Image 3.W.08)



Within Timeframes C & D (Image 3.W.15)



Within Timeframe E (Image 5.W.09)

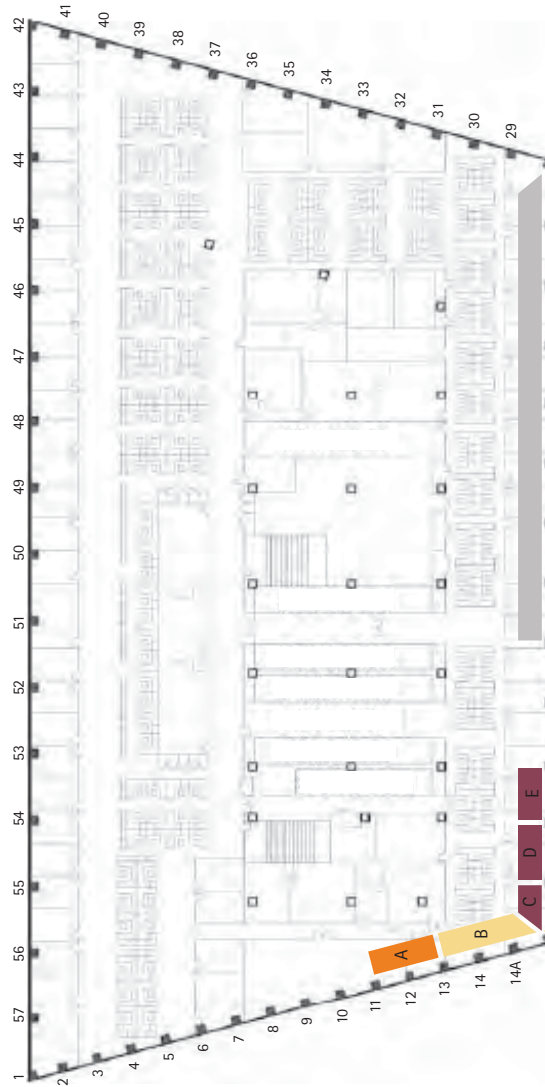
Figure 7.04 WTC7 Level 30 Planometric Fire Progression Diagram
Volume B - Fire Progression by Level
Photographic Analysis Report
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16 December 2009

NOTES

1. Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
2. Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.

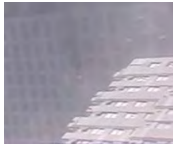
LEGEND	
Location of Burning Fire	
Location of Smoke; Burning Fire not shown	
Location only shown as Burned-Out	
Location Not Visible	

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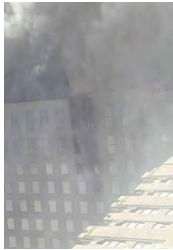


JA-3797

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 3.W.03 (12:10PM-12:27PM)	Image 3.W.14 (12:28PM-12:32PM)
B	Image 3.W.03 (12:10PM-12:27PM)	Image 3.W.06 (12:27PM)
C	Image 3.W.09 (12:28PM)	NA
D	Image 3.S.01 (after 12:40PM)	NA
E	5.W.09 (2:00PM-3:30PM)	NA



Within Timeframes A & B (Image 3.W.03)



Within Timeframe C (Image 3.W.09)



Within Timeframe D (Image 3.S.01)

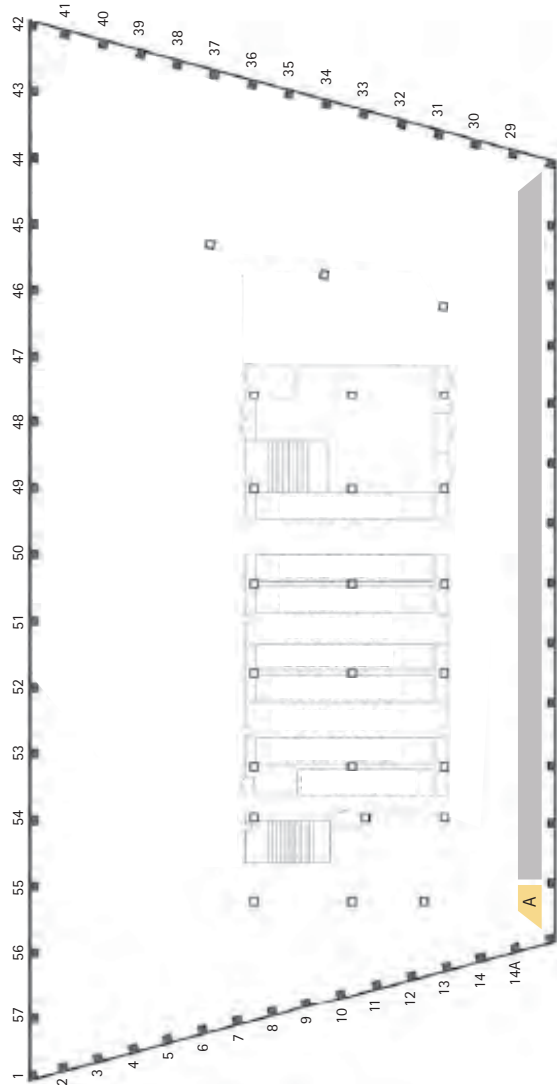


Within Timeframe E (Image 5.W.09)

Figure 7.05 WTC7 Level 29 Planometric Fire Progression Diagram

Volume B - Fire Progression by Level
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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - Floor plan shown blank due to insufficient information.

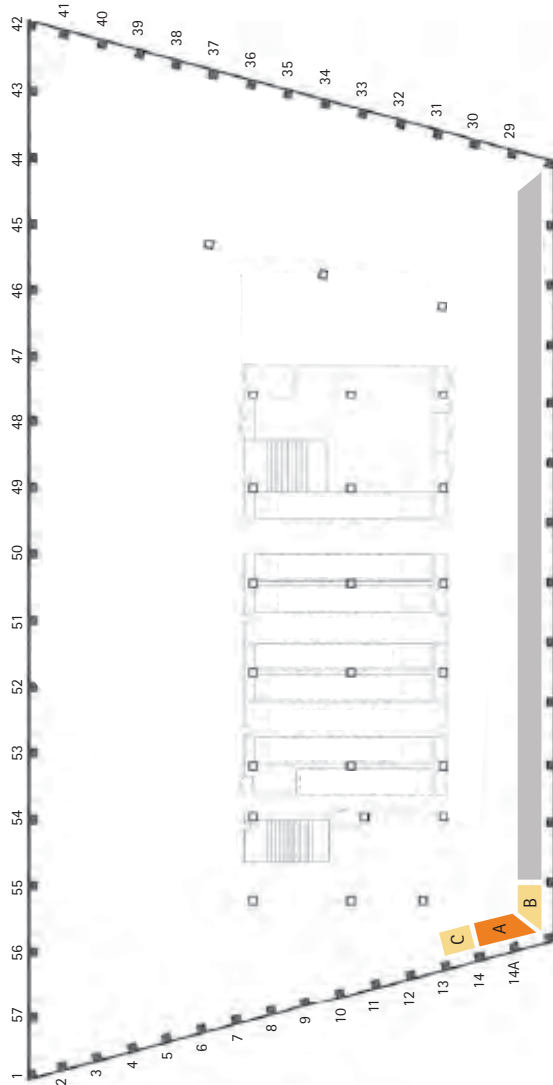


Within Timeframe A (Image 3.W.02)

Figure 7.06 WTC7 Level 23 Planometric Fire Progression Diagram

Volume B - Fire Progression by Level
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LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

- NOTES
- Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
 - Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
 - Floor plan shown blank due to insufficient information.

	FIRST VISUAL EVIDENCE OF FIRE	LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
A	Image 3.W.01 (12:10AM-12:25PM)	Image 3.W.02 (12:10PM-12:25PM) Image 6.W.30 (3:30PM-4:30PM)
B	Image 3.W.02 (12:10PM-12:25PM)	NA
C	Image 4.W.01 (around 1:00PM)	Image 6.W.30 (3:30PM-4:30PM)



Within Timeframe A (Image 3.W.01)



Within Timeframes A & B (Image 3.W.02)



Within Timeframe C (Image 6.W.13)

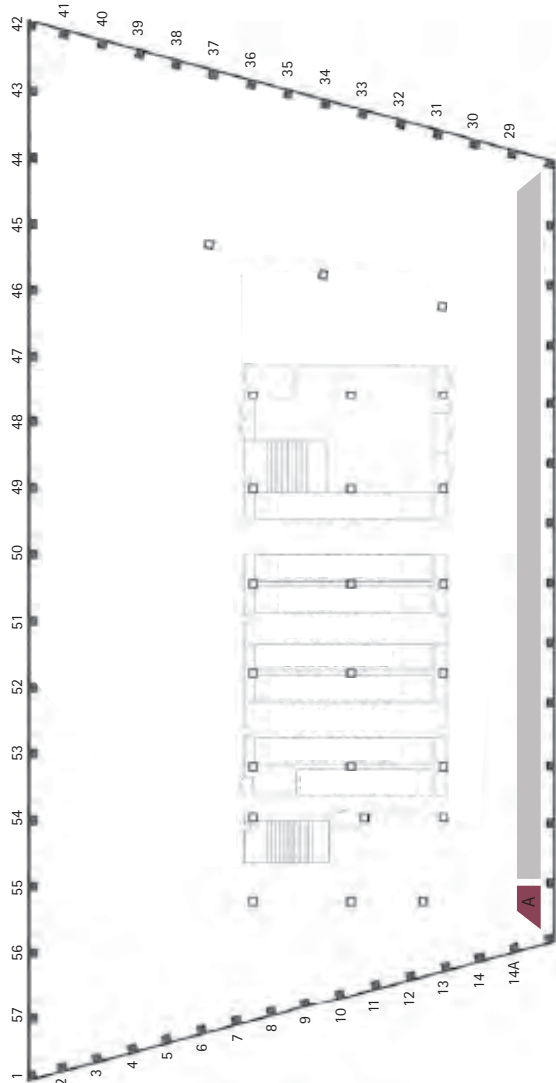


Within Timeframes A & C (Image 6.W.16)

Figure 7.07 WTC7 Level 22 Planometric Fire Progression Diagram

Volume B - Fire Progression by Level
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LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE
NA

FIRST VISUAL EVIDENCE OF FIRE
A 3.W.02 (12:10PM-12:25PM)

LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible

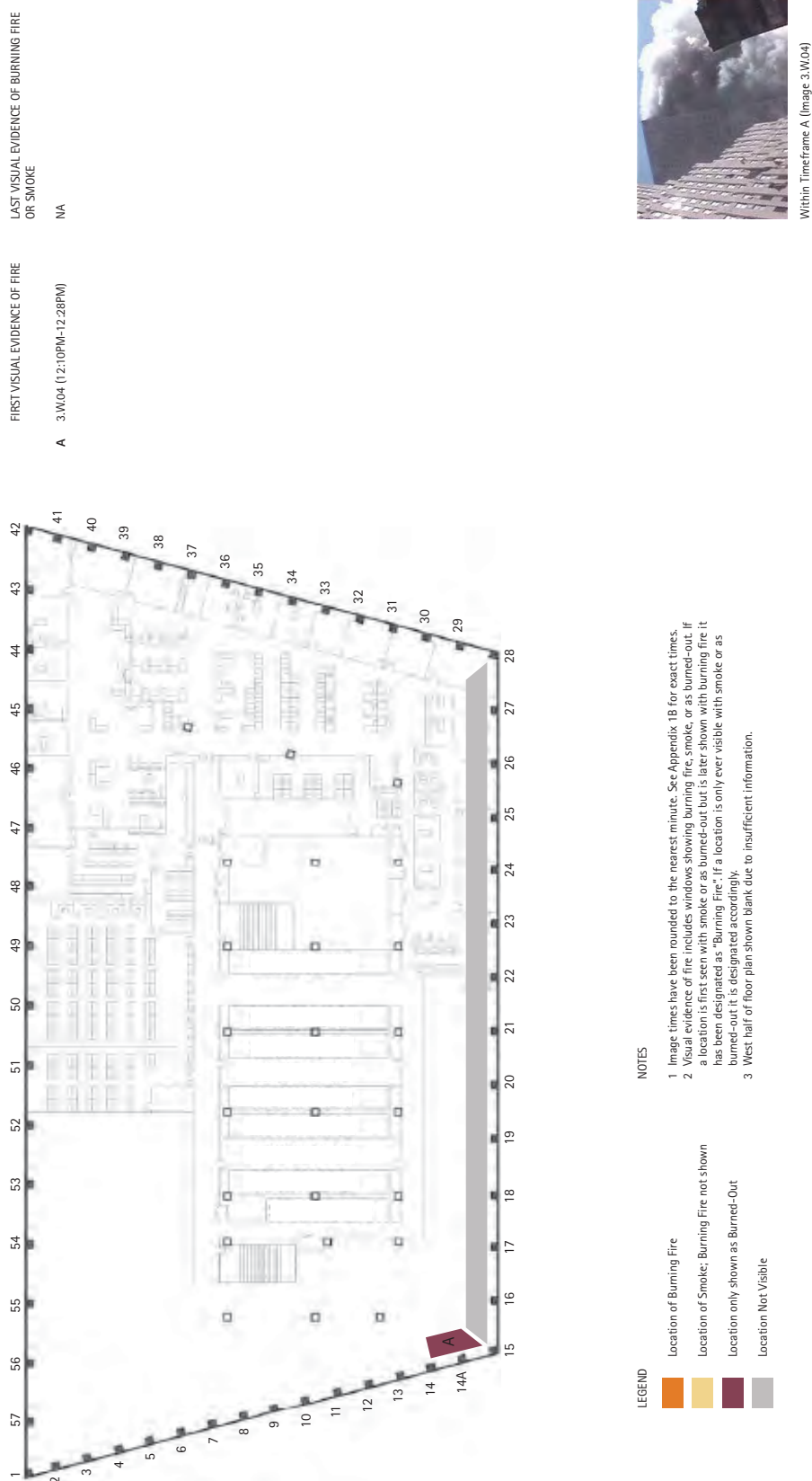
NOTES

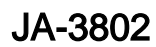
- 1 Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
- 2 Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.
- 3 Floor plan shown blank due to insufficient information.



Within Timeframe A (Image 3.W.02)

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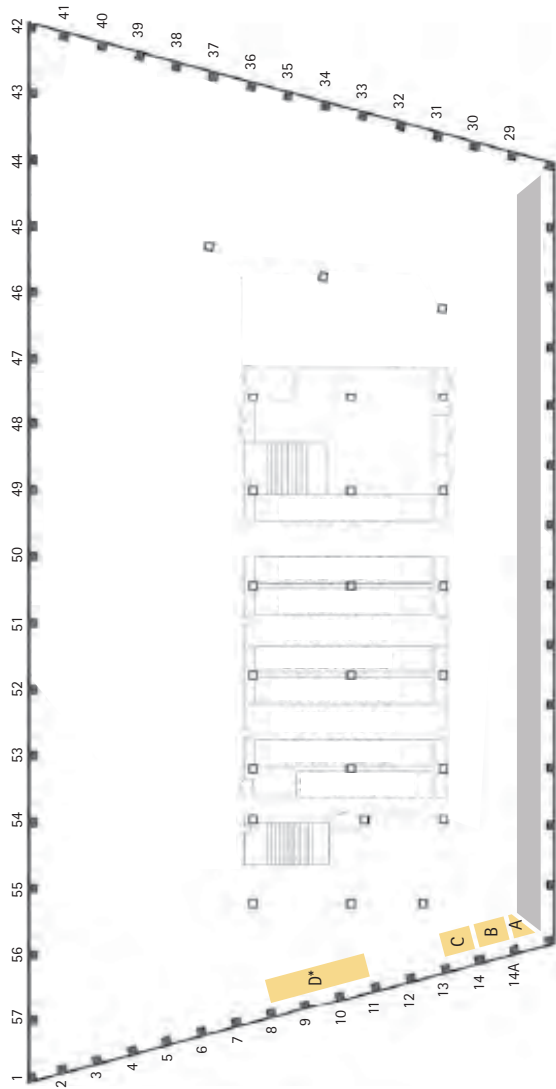
Location of Burning Fire
Location of Smoke; Burning Fire not shown
Location only shown as Burned-Out
Location Not Visible

- 1 Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
- 2 Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "burning fire." If a location is only ever visible with smoke or as burned-out it is designated accordingly.
- 3 Floor plan shown blank due to insufficient information.

Volume B - Fire Progression by Level
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Within Timeframe B (Image 6.W.20)

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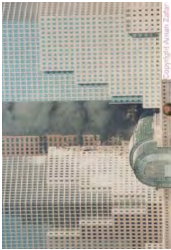


JA-3803


FIRST VISUAL EVIDENCE OF FIRE		LAST VISUAL EVIDENCE OF BURNING FIRE OR SMOKE	
A	Image 4.W.21 (shortly after 1:30PM)	Image 6.W.16 (3:00PM-4:30PM)	Within Timeframes A, B, & C (Image 6.W.16)
B	Image 5.W.09 (2:00PM-3:30PM)*	Image 6.W.16 (3:00PM-4:30PM)	
C	Image 6.W.07 (3:00PM-4:30PM)*	Image 6.W.16 (3:00PM-4:30PM)	
D	Image 6.W.21 (3:00PM-4:30PM)*	NA	




Within Timeframe A (Image 4.W.21)



Within Timeframes A, B, & C (Image 6.W.16)



Within Timeframe C (Image 5.W.09)



Within Timeframe D (Image 6.W.07)

Figure 7.11 WTC7 Level 17 Planometric Fire Progression Diagram

Volume B - Fire Progression by Level
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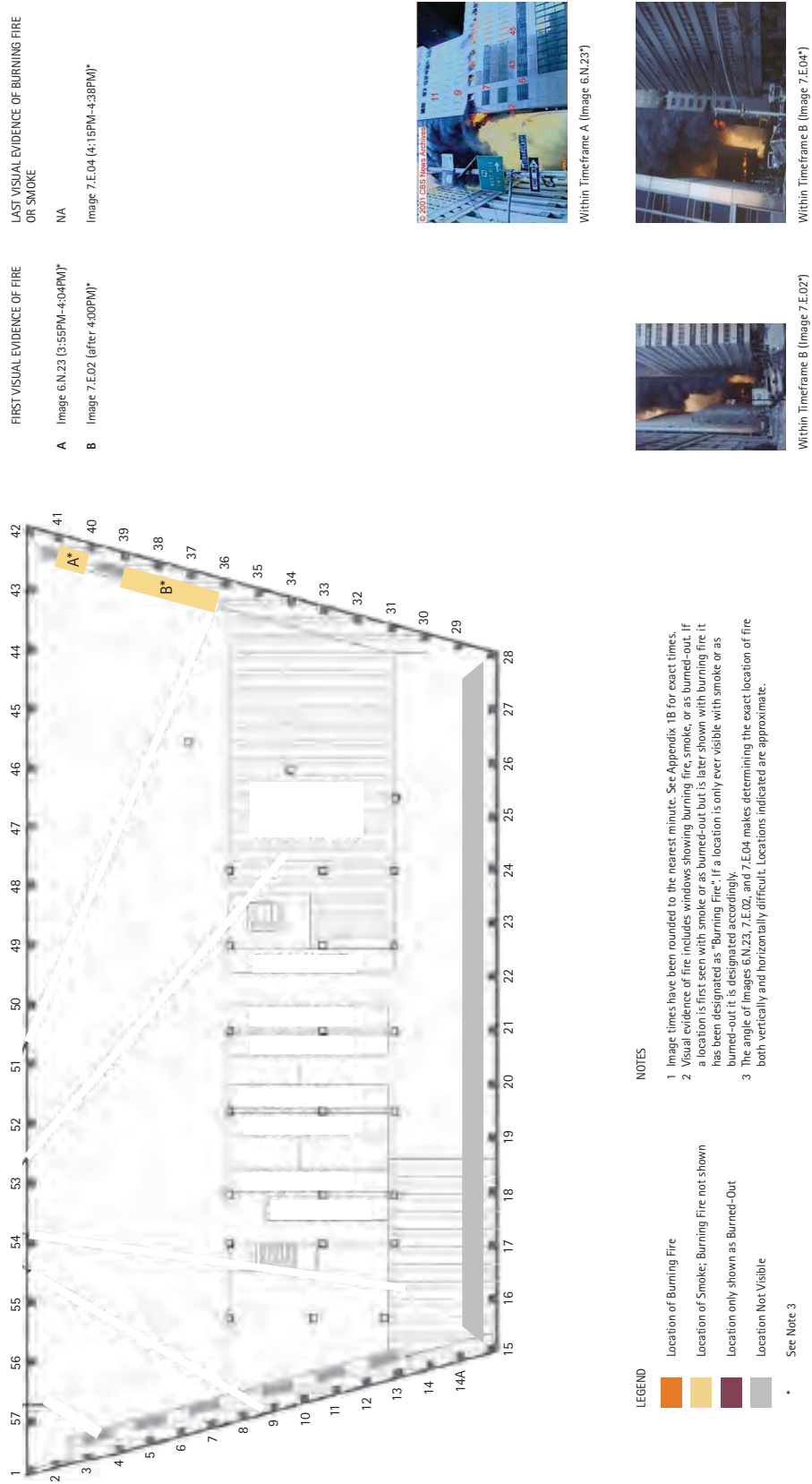
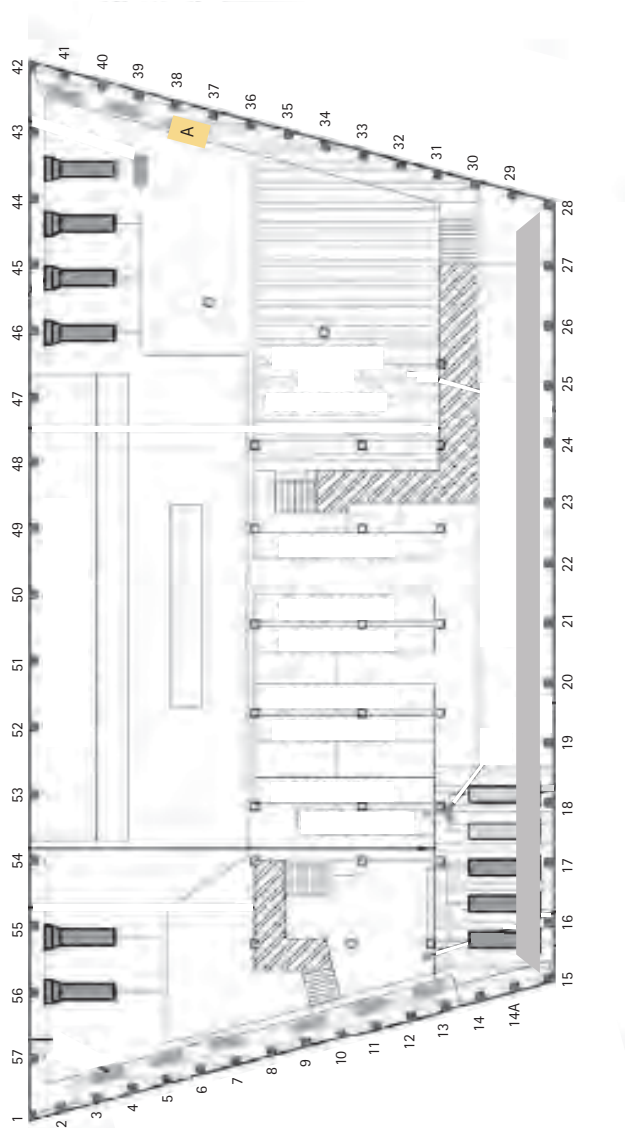


Figure 7.12 WTC7 Level 6 Planometric Fire Progression Diagrams

Volume B - Fire Progression by Level
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FIRST VISUAL EVIDENCE OF FIRE
A Image 5.E.17 (2:13PM)

LAST VISUAL EVIDENCE OF BURNING FIRE
OR SMOKE
NA

NOTES

- 1 Image times have been rounded to the nearest minute. See Appendix 1B for exact times.
- 2 Visual evidence of fire includes windows showing burning fire, smoke, or as burned-out. If a location is first seen with smoke or as burned-out but is later shown with burning fire it has been designated as "Burning Fire". If a location is only ever visible with smoke or as burned-out it is designated accordingly.

LEGEND

- Location of Burning Fire
- Location of Smoke; Burning Fire not shown
- Location only shown as Burned-Out
- Location Not Visible



Within Timeframe A (Image 5.E.17)

Figure 7.13 WTC7 Level 5 Planometric Fire Progression Diagrams

Volume B - Fire Progression by Level
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APPENDIX 1B

Photographic Fire Index

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Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
33	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
33	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-16
33	GNA	est after 2:00PM	5.S.01	South	Burned-out	15-16
33	GNA	est after 2:00PM	5.S.02	South	Burned-out	15-19
32	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
32	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-18
32	GNA	est after 2:00PM	5.S.02	South	Burned-out	15-19
32	NIST	mid-late afternoon	7.S.01	South	Burned-out	15-16
31	GNA	est 2:00PM-3:00PM	5.W.04	South	Burned-out	15-16
31	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
31	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-18
31	GNA	est after 2:00PM	5.S.02	South	Burned-out	15-19
31	NIST	mid-late afternoon	7.S.01	South	Burned-out	15-18
30	FILE	11:33:21AM	2.W.02	West	Burned-out?	14-15
30	GNA	est 12:10PM-12:28PM	3.W.04	West	Burned-out	14-15
30	GNA	est 12:10PM-12:28PM	3.W.05	West	Burned-out	13-15
30	FILE	12:27:17PM +/-1s	3.W.06	West	Burned-out	13-14
30	FILE	12:27:17PM +/-1s	3.W.06	West	Smoke	14-15
30	NIST	12:27:30PM +/-1s	3.W.07	West	Burned-out	13-14
30	NIST	12:27:30PM +/-1s	3.W.07	West	Smoke	14-15
30	GNA	est 12:27PM-12:28PM	3.W.08	West	Burned-out	12-15
30	GNA	est 12:27PM-12:28PM	3.W.08	South	External Fire / Broken Window	15-16
30	FILE	12:28:40PM +/-1s	3.W.09	West	Burned-out	12-14
30	FILE	12:28:40PM +/-1s	3.W.09	West	Internal Fire / Broken Window	14-15
30	FILE	12:28:40PM +/-1s	3.W.09	South	External Fire / Broken Window	15-17
30	GNA	est 12:28PM-12:31PM	3.W.10	West	Burned-out	12-14
30	GNA	est 12:28PM-12:31PM	3.W.10	West	Internal Fire / Broken Window	14-15
30	GNA	est 12:28PM-12:31PM	3.W.10	South	External Fire / Broken Window	15-16
30	GNA	est 12:28PM-12:31PM	3.W.11	West	Burned-out	12-14
30	GNA	est 12:28PM-12:31PM	3.W.11	West	Internal Fire / Broken Window	14-15
30	GNA	est 12:28PM-12:31PM	3.W.11	South	External Fire / Broken Window	15-16
30	NIST	12:28PM +/-180s	3.W.12	West	Burned-out	12-14
30	NIST	12:28PM +/-180s	3.W.12	West	Internal Fire / Broken Window	14-15
30	NIST	12:28PM +/-180s	3.W.12	South	External Fire / Broken Window	15-17
30	GNA	est 12:28PM-12:32PM	3.W.13	West	Burned-out	12-14A
30	GNA	est 12:28PM-12:32PM	3.W.13	West	Internal Fire / Broken Window	14A-15
30	GNA	est 12:28PM-12:32PM	3.W.13	South	External Fire / Broken Window	15-17
30	GNA	est 12:28PM-12:32PM	3.W.14	West	Burned-out	12-14A
30	GNA	est 12:28PM-12:32PM	3.W.14	West	Internal Fire / Broken Window	14A-15
30	GNA	est 12:28PM-12:32PM	3.W.14	South	External Fire / Broken Window	15-16
30	GNA	est 12:28PM-12:32PM	3.W.15	West	Smoke	12-14
30	GNA	est 12:28PM-12:32PM	3.W.15	West	Burned-out	14-15
30	GNA	est 12:28PM-12:32PM	3.W.16	West	Burned-out	12-13, 14-15
30	GNA	est 12:28PM-12:32PM	3.W.16	West	Smoke	13-14
30	FILE	12:32:55PM +/-1s	3.W.17	West	Burned-out	13-15
30	FILE	12:32:55PM +/-1s	3.W.17	South	External Fire / Broken Window	15-17
30	FILE	12:33:03PM +/-1s	3.W.18	West	Burned-out	12-15
30	FILE	12:33:03PM +/-1s	3.W.18	South	External Fire / Broken Window	15-17
30	GNA	est 12:30PM-1:00PM	3.W.19	West	Burned-out	12-15
30	GNA	est 12:30PM-1:00PM	3.W.22	West	Burned-out	12-15
30	GNA	est 12:30PM-1:00PM	3.W.22	South	Internal Fire / Broken Window	15-16

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
30	GNA	est 12:30PM-1:00PM	3.W.23	West	Burned-out	12-15
30	GNA	est after 12:40PM	3.W.24	West	Burned-out	12-15
30	FILE	12:46:48PM +/-1s	3.W.26	West	Burned-out	12-15
30	FILE	12:47:40PM +/-1s	3.W.27	West	Burned-out	12-15
30	GNA	est 12:30PM-2:00PM	3.W.28	West	Burned-out	12-15
30	GNA	est 12:30PM-2:00PM	3.W.29	West	Burned-out	12-15
30	GNA	est 12:30PM-2:00PM	3.W.30	West	Burned-out	12-15
30	GNA	est 12:30PM-2:00PM	3.W.31	West	Burned-out	12-15
30	FILE	1:03:44PM +/-1s	4.W.02	West	Burned-out	12-15
30	GNA	est 1:00PM-1:45PM	4.W.03	West	Burned-out	14-15
30	GNA	est 1:00PM-2:00PM	4.W.04	West	Burned-out	12-15
30	GNA	est 1:00PM-1:45PM	4.W.05	West	Burned-out	12-15
30	GNA	est 1:00PM-2:00PM	4.W.08	West	Burned-out	12-15
30	GNA	est 1:00PM-2:00PM	4.W.14	West	Burned-out	12-15
30	GNA	est 1:30PM-2:00PM	4.W.16	West	Burned-out	14-15
30	GNA	est 1:30PM-2:00PM	4.W.18	West	Burned-out	14-15
30	NIST	shortly after 1:30PM	4.W.22	West	Burned-out	12-15
30	GNA	est 1:30PM-2:00PM	4.W.23	West	Burned-out	12-15
30	GNA	est 1:30PM-2:00PM	4.W.24	West	Burned-out	13-15
30	GNA	est 1:00PM-2:00PM	4.W.25	West	Burned-out	14A-15
30	GNA	est 1:00PM-2:00PM	4.W.26	West	Burned-out	14-15
30	GNA	est 1:30PM-2:00PM	4.W.27	West	Burned-out	14-15
30	GNA	est 2:00PM-3:00PM	5.W.02	West	Burned-out	13-15
30	GNA	est 2:00PM-3:00PM	5.W.04	West	Burned-out	11-15
30	GNA	est 2:00PM-3:00PM	5.W.04	South	Burned-out	15-16
30	GNA	est 2:00PM-3:00PM	5.W.05	West	Burned-out	11-15
30	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
30	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out	11-15
30	GNA	est 2:00PM-3:30PM	5.W.09	West	Burned-out	11-15
30	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-18
30	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out	11-15
30	GNA	est after 2:00PM	5.S.02	West	Burned-out	11-15
30	GNA	est after 2:00PM	5.S.02	South	Burned-out	15-18
30	GNA	est shortly after 3:00PM	6.W.01	West	Burned-out	11-15
30	GNA	est shortly after 3:00PM	6.W.01	South	Burned-out	15-16
30	GNA	est shortly after 3:00PM	6.W.02	West	Burned-out	11-15
30	GNA	est shortly after 3:00PM	6.W.02	South	Burned-out	15-16
30	NIST	shortly after 3:00PM	6.W.03	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.04	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.05	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.06	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.07	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.08	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.09	West	Burned-out	12-15
30	GNA	est 3:00PM-4:30PM	6.W.10	West	Burned-out	12-15
30	GNA	est 3:00PM-4:30PM	6.W.11	West	Burned-out	14A-15
30	GNA	est 3:00PM-4:30PM	6.W.12	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.13	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.14	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.15	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.16	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.16	South	Burned-out	15-16
30	GNA	est 3:00PM-4:30PM	6.W.17	West	Burned-out	12-15
30	GNA	est 3:00PM-4:30PM	6.W.18	West	Burned-out	14-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
30	GNA	est 3:00PM-4:30PM	6.W.20	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.21	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.22	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.23	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.23	South	Burned-out	15-16
30	GNA	est 3:00PM-4:30PM	6.W.25	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.26	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.27	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.28	West	Burned-out	11-15
30	GNA	est 3:00PM-4:30PM	6.W.29	West	Burned-out	11-15
30	NIST	3:30PM-4:30PM	6.W.30	West	Burned-out	11-15
30	NIST	3:30PM-4:30PM	6.W.30	South	Burned-out	15-16
30	GNA	est 3:30PM-4:30PM	6.W.31	West	Burned-out	14?-15
30	GNA	est after 4:00PM	7.W.01	West	Burned-out	13-15
30	GNA	est after 4:00PM	7.W.02	West	Burned-out	13-15
30	GNA	est after 4:00PM	7.W.03	West	Burned-out	13-15
30	NIST	mid-late afternoon	7.S.01	West	Burned-out	12-15
30	NIST	mid-late afternoon	7.S.01	South	Burned-out	15-16
29	GNA	est 10:30AM-12:30PM	2.W.01	West	Burned-out	12-15
29	FILE	11:33:21AM	2.W.02	West	Burned-out	11?-15
29	GNA	est 12:10PM-12:27PM	3.W.03	West	Internal Fire / Broken Window	11-12
29	GNA	est 12:10PM-12:27PM	3.W.03	West	Smoke	12-15
29	GNA	est 12:10PM-12:28PM	3.W.04	West	Burned-out	11-15
29	GNA	est 12:10PM-12:28PM	3.W.05	West	Burned-out	11-15
29	FILE	12:27:17PM +/-1s	3.W.06	West	Internal Fire / Broken Window	11-13
29	FILE	12:27:17PM +/-1s	3.W.06	West	Smoke	13-15
29	NIST	12:27:30PM +/-1s	3.W.07	West	Internal Fire / Broken Window	11-13
29	NIST	12:27:30PM +/-1s	3.W.07	West	Burned-out	13-15
29	GNA	est 12:27PM-12:28PM	3.W.08	West	Internal Fire / Broken Window	11-13
29	GNA	est 12:27PM-12:28PM	3.W.08	West	Burned-out	13-15
29	FILE	12:28:40PM +/-1s	3.W.09	West	Burned-out	11-12, 13-15
29	FILE	12:28:40PM +/-1s	3.W.09	West	Internal Fire / Broken Window	12-13
29	FILE	12:28:40PM +/-1s	3.W.09	South	Burned-out	15-16
29	GNA	est 12:28PM-12:31PM	3.W.10	West	Internal Fire / Broken Window	11-13
29	GNA	est 12:28PM-12:31PM	3.W.10	West	Burned-out	13-15
29	GNA	est 12:28PM-12:31PM	3.W.11	West	Internal Fire / Broken Window	11-13
29	GNA	est 12:28PM-12:31PM	3.W.11	West	Burned-out	13-15
29	NIST	12:28PM +/-180s	3.W.12	West	Internal Fire / Broken Window	11-13
29	NIST	12:28PM +/-180s	3.W.12	West	Burned-out	13-15
29	NIST	12:28PM +/-180s	3.W.12	South	Burned-out	15-16
29	GNA	est 12:28PM-12:32PM	3.W.13	West	Internal Fire / Broken Window	11-13
29	GNA	est 12:28PM-12:32PM	3.W.13	West	Burned-out	13-15
29	GNA	est 12:28PM-12:32PM	3.W.14	West	Internal Fire / Broken Window	11-13
29	GNA	est 12:28PM-12:32PM	3.W.14	West	Burned-out	13-15
29	GNA	est 12:28PM-12:32PM	3.W.15	West	Burned-out	11-15
29	GNA	est 12:28PM-12:32PM	3.W.16	West	Burned-out	12-15
29	FILE	12:32:55PM +/-1s	3.W.17	West	Burned-out	13-15
29	FILE	12:33:03PM +/-1s	3.W.18	West	Burned-out	12-15
29	GNA	est 12:30PM-1:00PM	3.W.19	West	Burned-out	11-15
29	GNA	est 12:30PM-1:00PM	3.W.22	West	Burned-out	12-15
29	GNA	est 12:30PM-1:00PM	3.W.23	West	Burned-out	11-15
29	GNA	est after 12:40PM	3.W.24	West	Burned-out	11-15
29	NIST	12:46:39PM	3.W.25	West	Burned-out	11-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
29	FILE	12:46:48PM +/-1s	3.W.26	West	Burned-out	11-15
29	FILE	12:47:40PM +/-1s	3.W.27	West	Burned-out	11-15
29	GNA	est 12:30PM-2:00PM	3.W.28	West	Burned-out	11?-15
29	GNA	est 12:30PM-2:00PM	3.W.29	West	Burned-out	11-15
29	GNA	est 12:30PM-2:00PM	3.W.30	West	Burned-out	11-15
29	GNA	est 12:30PM-2:00PM	3.W.31	West	Burned-out	11-15
29	GNA	est after 12:40PM	3.S.01	South	Burned-out	15-17
29	NIST	around 1:00PM	4.W.01	West	Burned-out	11-15
29	FILE	1:03:44PM +/-1s	4.W.02	West	Burned-out	12-15
29	GNA	est 1:00PM-1:45PM	4.W.03	West	Burned-out	14-15
29	GNA	est 1:00PM-2:00PM	4.W.04	West	Burned-out	11-15
29	GNA	est 1:00PM-1:45PM	4.W.05	West	Burned-out	13-15
29	GNA	est 1:00PM-2:00PM	4.W.08	West	Burned-out	11-15
29	GNA	est 1:00PM-2:00PM	4.W.14	West	Burned-out	11-15
29	GNA	est 1:30PM-2:00PM	4.W.16	West	Burned-out	14A-15
29	GNA	est 1:30PM-2:00PM	4.W.18	West	Burned-out	14A-15
29	GNA	est 1:30PM-2:00PM	4.W.19	West	Burned-out	14A-15
29	NIST	shortly after 1:30PM	4.W.22	West	Burned-out	12-15
29	GNA	est 1:30PM-2:00PM	4.W.23	West	Burned-out	11-15
29	GNA	est 1:30PM-2:00PM	4.W.24	West	Burned-out	13-15
29	GNA	est 1:00PM-2:00PM	4.W.25	West	Burned-out	14A-15
29	GNA	est 1:00PM-2:00PM	4.W.26	West	Burned-out	14-15
29	GNA	est 1:30PM-2:00PM	4.W.27	West	Burned-out	14-15
29	GNA	est 2:00PM-3:00PM	5.W.02	West	Burned-out	14-15
29	GNA	est 2:00PM-3:00PM	5.W.04	West	Burned-out	11-15
29	GNA	est 2:00PM-3:00PM	5.W.04	South	Burned-out	15-16
29	GNA	est 2:00PM-3:00PM	5.W.05	West	Burned-out	11-15
29	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
29	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out	11-15
29	GNA	est 2:00PM-3:30PM	5.W.09	West	Burned-out	11-15
29	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-18
29	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out	11-15
29	GNA	est after 2:00PM	5.S.02	West	Burned-out	11-15
29	GNA	est after 2:00PM	5.S.02	South	Burned-out	15-18
29	GNA	est shortly after 3:00PM	6.W.01	West	Burned-out	11-15
29	GNA	est shortly after 3:00PM	6.W.02	West	Burned-out	11-15
29	GNA	est shortly after 3:00PM	6.W.02	South	Burned-out	15-16
29	NIST	shortly after 3:00PM	6.W.03	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.04	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.05	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.06	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.07	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.08	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.09	West	Burned-out	12-15
29	GNA	est 3:00PM-4:30PM	6.W.10	West	Burned-out	12-15
29	GNA	est 3:00PM-4:30PM	6.W.11	West	Burned-out	14A-15
29	GNA	est 3:00PM-4:30PM	6.W.12	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.13	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.14	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.15	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.16	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.16	South	Burned-out	15-16
29	GNA	est 3:00PM-4:30PM	6.W.17	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.18	West	Burned-out	14-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
29	GNA	est 3:00PM-4:30PM	6.W.20	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.21	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.22	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.23	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.25	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.26	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.27	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.28	West	Burned-out	11-15
29	GNA	est 3:00PM-4:30PM	6.W.29	West	Burned-out	11-15
29	NIST	3:30PM-4:30PM	6.W.30	West	Burned-out	11-15
29	NIST	3:30PM-4:30PM	6.W.30	South	Burned-out	15-16
29	GNA	est 3:30PM-4:30PM	6.W.31	West	Burned-out	12?-15
29	GNA	est after 4:00PM	7.W.01	West	Burned-out	13-15
29	GNA	est after 4:00PM	7.W.02	West	Burned-out	13-15
29	GNA	est after 4:00PM	7.W.03	West	Burned-out	13-15
29	NIST	mid-late afternoon	7.S.01	West	Burned-out	12-15
29	NIST	mid-late afternoon	7.S.01	South	Burned-out	15-16
23	NIST	12:10PM-12:25PM	3.W.02	South	Smoke	15-16
23	GNA	est 2:00PM-3:00PM	5.W.04	South	Burned-out	15-16
23	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
23	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-16
22	GNA	est 12:10PM-12:25PM	3.W.01	West	Internal Fire / Broken Window	14A-15
22	NIST	12:10PM-12:25PM	3.W.02	West	Internal Fire / Broken Window	14A-15
22	NIST	12:10PM-12:25PM	3.W.02	South	Smoke	15-16
22	GNA	est 12:10PM-12:27PM	3.W.03	West	Burned-out	14A-15
22	GNA	est 12:10PM-12:28PM	3.W.04	West	Burned-out?	14A-15
22	GNA	est 12:10PM-12:28PM	3.W.05	West	Burned-out	14A-15
22	FILE	12:27:17PM +/-1s	3.W.06	West	Burned-out	14A-15
22	NIST	12:27:30PM +/-1s	3.W.07	West	Burned-out	14A-15
22	FILE	12:28:40PM +/-1s	3.W.09	West	Smoke	14A-15
22	GNA	est 12:28PM-12:31PM	3.W.11	West	Burned-out	14A-15
22	GNA	est 12:28PM-12:32PM	3.W.14	West	Burned-out	14A-15
22	GNA	est 12:28PM-12:32PM	3.W.15	West	Burned-out	14A-15
22	GNA	est 12:28PM-12:32PM	3.W.16	West	Burned-out	14A-15
22	FILE	12:32:55PM +/-1s	3.W.17	West	Burned-out	14A-15
22	GNA	est 12:30PM-1:00PM	3.W.19	West	Burned-out	14A-15
22	NIST	shortly before 12:46:39PM	3.W.20	West	Burned-out	14A-15
22	NIST	shortly after 12:30PM	3.W.21	West	Burned-out	14A-15
22	GNA	est 12:30PM-1:00PM	3.W.22	West	Burned-out	14A-15
22	GNA	est 12:30PM-1:00PM	3.W.23	West	Burned-out	14A-15
22	NIST	12:46:39PM	3.W.25	West	Burned-out	14A-15
22	FILE	12:46:48PM +/-1s	3.W.26	West	Burned-out	14A-15
22	FILE	12:47:40PM +/-1s	3.W.27	West	Burned-out	14A-15
22	GNA	est 12:30PM-2:00PM	3.W.30	West	Burned-out	14-15?
22	GNA	est 12:47PM-1:03PM	3.W.32	West	Smoke	14A?-15
22	NIST	around 1:00PM	4.W.01	West	Smoke?	13-15
22	FILE	1:03:44PM +/-1s	4.W.02	West	Smoke	14?-15
22	GNA	est 1:00PM-1:45PM	4.W.03	West	Smoke	14A-15
22	GNA	est 1:00PM-2:00PM	4.W.04	West	Smoke	13-15
22	GNA	est 1:00PM-1:45PM	4.W.05	West	Burned-out	14-15
22	FILE	1:12:04PM +/-1s	4.W.06	West	Burned-out	14A-15
22	GNA	est 1:00PM-2:00PM	4.W.07	West	Burned-out	14A-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
22	GNA	est 1:00PM-2:00PM	4.W.08	West	Smoke	14-15
22	FILE	1:29:46PM +/-1s	4.W.09	West	Smoke	13-15
22	GNA	est 1:00PM-2:00PM	4.W.14	West	Burned-out	13-15
22	GNA	est 1:30PM-2:00PM	4.W.15	West	Smoke	13-15
22	GNA	est 1:30PM-2:00PM	4.W.16	West	Burned-out	14A-15
22	GNA	est 1:30PM-2:00PM	4.W.17	West	Burned-out	14-15
22	GNA	est 1:30PM-2:00PM	4.W.20	West	Smoke	13-15
22	NIST	shortly after 1:30PM	4.W.22	West	Smoke	14-15
22	GNA	est 1:30PM-2:00PM	4.W.23	West	Burned-out	13-15
22	GNA	est 1:30PM-2:00PM	4.W.24	West	Burned-out	14A-15
22	GNA	est 1:30PM-2:00PM	4.W.27	West	Burned-out	14A-15
22	GNA	est 2:00PM-3:00PM	5.W.01	West	Burned-out	14A-15
22	GNA	est 2:00PM-3:00PM	5.W.02	West	Burned-out	14A-15
22	GNA	est 2:00PM-3:00PM	5.W.03	West	Burned-out	14A-15
22	GNA	est 2:00PM-3:00PM	5.W.04	West	Burned-out	13-15
22	GNA	est 2:00PM-3:00PM	5.W.04	South	Burned-out	15-16
22	GNA	est 2:00PM-3:00PM	5.W.05	West	Burned-out	13-15
22	GNA	est 2:00PM-3:00PM	5.W.05	South	Burned-out	15-16
22	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out	13-15
22	GNA	est 2:00PM-3:30PM	5.W.09	West	Burned-out	13-15
22	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-16
22	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out	13-15
22	GNA	est shortly after 3:00PM	6.W.02	West	Smoke?	14-15
22	NIST	shortly after 3:00PM	6.W.03	West	Burned-out	13-15
22	GNA	est 3:00PM-4:30PM	6.W.04	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.06	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.07	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.08	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.12	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.13	West	Smoke?	13-15
22	GNA	est 3:00PM-4:30PM	6.W.16	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.17	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.19	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.20	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.21	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.22	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.23	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.24	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.25	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.26	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.27	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.28	West	Smoke	13-15
22	GNA	est 3:00PM-4:30PM	6.W.29	West	Smoke	13-15
22	NIST	3:30PM-4:30PM	6.W.30	West	Smoke	13-15
21	NIST	12:10PM-12:25PM	3.W.02	South	Burned-out	15-16
21	GNA	est 2:00PM-3:30PM	5.W.09	South	Burned-out	15-16
19	GNA	est 12:10PM-12:28PM	3.W.04	West	Burned-out	14-15
19	GNA	est 12:10PM-12:28PM	3.W.05	West	Burned-out	14-15
19	FILE	12:27:17PM +/-1s	3.W.06	West	Burned-out	14-15
19	GNA	est 12:28PM-12:31PM	3.W.11	West	Burned-out	14-15
19	GNA	est 12:28PM-12:32PM	3.W.15	West	Burned-out	14A-15
19	GNA	est 12:28PM-12:32PM	3.W.16	West	Burned-out	14A-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
19	NIST	shortly before 12:46:39PM	3.W.20	West	Burned-out	14A-15
19	NIST	shortly after 12:30PM	3.W.21	West	Burned-out	14A-15
19	GNA	est 12:30PM-1:00PM	3.W.22	West	Burned-out	14A-15
19	GNA	est 12:30PM-1:00PM	3.W.23	West	Burned-out	14A-15
19	NIST	12:46:39PM	3.W.25	West	Burned-out	14A-15
19	FILE	12:46:48PM +/-1s	3.W.26	West	Burned-out	14A-15
19	FILE	12:47:40PM +/-1s	3.W.27	West	Burned-out	14-15
19	GNA	est 12:30PM-2:00PM	3.W.30	West	Burned-out	14-15
19	GNA	est 12:47PM-1:03PM	3.W.32	West	Burned-out	14A-15
19	FILE	1:03:44PM +/-1s	4.W.02	West	Burned-out	14A-15
19	GNA	est 1:00PM-2:00PM	4.W.04	West	Burned-out	14-15
19	GNA	est 1:00PM-1:45PM	4.W.05	West	Burned-out	14A-15
19	GNA	est 1:00PM-2:00PM	4.W.08	West	Burned-out	14A-15
19	FILE	1:29:46PM +/-1s	4.W.09	West	Burned-out	14-15
19	GNA	est 1:00PM-2:00PM	4.W.14	West	Burned-out	14-15
19	GNA	est 1:30PM-2:00PM	4.W.15	West	Burned-out	14-15
19	GNA	est 1:30PM-2:00PM	4.W.17	West	Burned-out	14A-15
19	GNA	est 1:30PM-2:00PM	4.W.20	West	Burned-out	14-15
19	NIST	shortly after 1:30PM	4.W.21	West	Burned-out	14-15
19	NIST	shortly after 1:30PM	4.W.22	West	Burned-out	14A-15
19	GNA	est 2:00PM-3:00PM	5.W.04	West	Burned-out	14-15
19	GNA	est 2:00PM-3:00PM	5.W.05	West	Burned-out	14-15
19	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out	14-15
19	GNA	est 2:00PM-3:30PM	5.W.08	West	Burned-out	14-15
19	GNA	est 2:00PM-3:30PM	5.W.09	West	Burned-out	14-15
19	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.06	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.07	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.08	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.16	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.17	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.18	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.19	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.20	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.21	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.22	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.23	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.24	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.26	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.27	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.28	West	Burned-out	14-15
19	GNA	est 3:00PM-4:30PM	6.W.29	West	Burned-out	14-15
19	NIST	3:30PM-4:30PM	6.W.30	West	Burned-out	14-15
18	NIST	shortly after 12:30PM	3.W.21	West	Smoke	14A-15
18	FILE	12:47:40PM +/-1s	3.W.27	West	Smoke	14-15
18	GNA	est 12:30PM-2:00PM	3.W.30	West	Smoke	14-15
18	FILE	1:03:44PM +/-1s	4.W.02	West	Smoke?	14A-15
18	GNA	est 1:00PM-2:00PM	4.W.04	West	Smoke	14-15
18	GNA	est 1:00PM-1:45PM	4.W.05	West	Smoke?	14A-15
18	GNA	est 1:00PM-2:00PM	4.W.08	West	Smoke	14A-15
18	GNA	est 1:00PM-2:00PM	4.W.14	West	Smoke	14-15
18	GNA	est 1:30PM-2:00PM	4.W.17	West	Smoke	14A-15
18	GNA	est 1:30PM-2:00PM	4.W.20	West	Smoke	14-15

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
18	NIST	shortly after 1:30PM	4.W.21	West	Smoke	14-15
18	GNA	est 2:00PM-3:00PM	5.W.04	West	Smoke	13-15
18	GNA	est 2:00PM-3:00PM	5.W.05	West	Burned-out	13-14
18	GNA	est 2:00PM-3:00PM	5.W.05	West	Smoke	14-15
18	NIST	2:15PM-2:45PM	5.W.06	West	Smoke	8-9
18	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out	13-15
18	GNA	est 2:00PM-3:30PM	5.W.08	West	Smoke?	14-15
18	GNA	est 2:00PM-3:30PM	5.W.09	West	Burned-out?	13-15
18	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out	8-9, 13-15
18	GNA	est 3:00PM-4:30PM	6.W.04	West	Smoke?	8-9, 13-15
18	GNA	est 3:00PM-4:30PM	6.W.06	West	Smoke?	8-9
18	GNA	est 3:00PM-4:30PM	6.W.07	West	Smoke?	13?-15
18	GNA	est 3:00PM-4:30PM	6.W.08	West	Smoke?	14-15
18	GNA	est 3:00PM-4:30PM	6.W.16	West	Smoke	13-15
18	GNA	est 3:00PM-4:30PM	6.W.17	West	Smoke	8-9
18	GNA	est 3:00PM-4:30PM	6.W.18	West	Smoke	8-9
18	GNA	est 3:00PM-4:30PM	6.W.19	West	Smoke	8-9, 13-15
18	GNA	est 3:00PM-4:30PM	6.W.20	West	Smoke	8-9, 13-15
18	GNA	est 3:00PM-4:30PM	6.W.21	West	Smoke	14-15
18	GNA	est 3:00PM-4:30PM	6.W.22	West	Smoke	14-15
18	GNA	est 3:00PM-4:30PM	6.W.24	West	Smoke	8-9, 14-15
18	GNA	est 3:00PM-4:30PM	6.W.28	West	Smoke	8-9
18	NIST	3:30PM-4:30PM	6.W.30	West	Smoke	14-15
17	NIST	shortly after 1:30PM	4.W.21	West	Smoke	14A-15
17	NIST	2:15PM-2:45PM	5.W.06	West	Burned-out?	14-15
17	GNA	est 2:00PM-3:30PM	5.W.09	West	Smoke?	14-15
17	NIST	2:30PM-3:00PM	5.W.10	West	Burned-out?	14-15
17	GNA	est 3:00PM-4:30PM	6.W.06	West	Smoke	14-15
17	GNA	est 3:00PM-4:30PM	6.W.07	West	Smoke?	13?-15
17	GNA	est 3:00PM-4:30PM	6.W.16	West	Smoke	13-15
17	GNA	est 3:00PM-4:30PM	6.W.21	West	Smoke?	8-11
17	GNA	est 3:00PM-4:30PM	6.W.22	West	Burned-out?	8-11
13	GNA	est 2:28PM-3:10PM	5.E.54	East	Smoke	31-32
13	GNA	est 2:28PM-3:10PM	5.E.54	East	External Fire / Broken Window	32-36
13	GNA	est 3:20PM-3:40PM	6.E.01	East	External Fire / Broken Window	29-32, 37-41?
13	GNA	est 3:20PM-3:40PM	6.E.01	East	Smoke	32-37?
13	NIST	likely 3:20PM-3:40PM	6.E.02	East	External Fire / Broken Window	29-30, 37-41?
13	NIST	likely 3:20PM-3:40PM	6.E.02	East	Smoke	30-37?
13?	GNA	est 3:20PM-3:40PM	6.E.03	East	External Fire / Broken Window	38-42?
13?	GNA	est 3:20PM-3:40PM	6.E.04	East	External Fire / Broken Window	?
13	GNA	est 3:20PM-3:54PM	6.N.11	North	Internal Fire / Broken Window	44-46
13	NIST	3:41PM +/- 180s	6.N.12	North	Internal Fire / Broken Window	45-46
13	NIST	3:42:30PM +/- 120s	6.N.13	North	Internal Fire / Broken Window	44-46
13	NIST	3:44PM +/- 240s	6.N.15	North	Burned-out	42-44
13	NIST	3:44PM +/- 240s	6.N.15	North	Smoke	44-46
13	NIST	3:50:13PM +/- 180s	6.N.16	North	Internal Fire / Broken Window	44-46
13	NIST	3:49PM-3:54PM	6.N.17	North	Burned-out	42-43, 44-47
13	NIST	3:49PM-3:54PM	6.N.17	North	Internal Fire / Broken Window	43-45
13	NIST	3:51PM-3:58PM	6.N.19	North	Smoke	43-44
13	NIST	3:51PM-3:58PM	6.N.19	North	Internal Fire / Broken Window	44-45
13	NIST	3:51PM-3:58PM	6.N.19	North	Burned-out	47-48
13	NIST	near 3:55PM	6.N.21	North	Burned-out	44-48

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Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
13	NIST	near 3:55PM	6.N.21	North	Internal Fire / Broken Window	48-49
13	NIST	3:53PM-4:02PM	6.N.22	North	Burned-out	42-43, 45-48
13	NIST	3:53PM-4:02PM	6.N.22	North	Internal Fire / Broken Window	43-46
13	NIST	3:55PM-4:04PM	6.N.23	North	Internal Fire / Broken Window	43-45
13	GNA	est 4:15PM-4:38PM	7.E.03	East	External Fire / Broken Window	41-42
13	GNA	est 4:15PM-4:38PM	7.E.03	North	Burned-out	42-43
13	GNA	est 4:15PM-4:38PM	7.E.04	East	External Fire / Broken Window	41-42
13	GNA	est 4:15PM-4:38PM	7.E.04	North	Burned-out	42-43
13	NIST	4:38:14PM +/- 1s	7.N.06	North	Burned-out	44-48
13	NIST	around 5:00PM +/- 600s	8.N.01	North	Internal Fire / Broken Window	53-55
13	NIST	likely few minutes before collapse	8.N.07	North	External Fire / Broken Window	54-55
12	NIST	1:30PM-2:30PM	4.W.10	West	Smoke	10-11
12?	GNA	est 2:00PM-2:28PM	5.E.01	East	Smoke	?
12	GNA	est 2:00PM-2:08PM	5.E.02	East	Burned-out	29-30
12	GNA	est 2:00PM-2:08PM	5.E.02	East	Internal Fire / Broken Window	31-33
12	GNA	est 2:00PM-2:08PM	5.E.02	East	Smoke	33-34, 35-36
12	GNA	est 2:00PM-2:08PM	5.E.02	East	External Fire / Broken Window	34-35
12	GNA	est 2:00PM-2:08PM	5.E.04	East	Burned-out	31-35?
12	GNA	est 2:00PM-2:08PM	5.E.04	East	Smoke	35-36?
12	GNA	est 2:00PM-2:08PM	5.E.05	East	Smoke	29-31, 35-36
12	GNA	est 2:00PM-2:08PM	5.E.05	East	Internal Fire / Broken Window	31-32
12	GNA	est 2:00PM-2:08PM	5.E.05	East	External Fire / Broken Window	32-35
12	GNA	est 2:00PM-2:08PM	5.E.06	East	Smoke	35-36
12	GNA	est 2:00PM-2:08PM	5.E.06	East	Internal Fire / Broken Window	29-32
12	GNA	est 2:00PM-2:08PM	5.E.06	East	External Fire / Broken Window	32-35
12	GNA	est 2:00PM-2:08PM	5.E.07	East	Internal Fire / Broken Window	29-30
12	GNA	est 2:00PM-2:08PM	5.E.07	East	External Fire / Broken Window	30-36
12	FILE	2:08:28PM +/- 1s	5.E.08	East	External Fire / Broken Window	29-30, 31-34
12	FILE	2:08:28PM +/- 1s	5.E.08	East	Smoke	30-31, 34-36
12	FILE	2:08:28PM +/- 1s	5.E.08	East	Internal Fire / Broken Window	36-37
12	FILE	2:08:45PM +/- 1s	5.E.09	East	Burned-out	29-31
12	FILE	2:08:45PM +/- 1s	5.E.09	East	External Fire / Broken Window	31-35
12	FILE	2:08:45PM +/- 1s	5.E.09	East	Smoke	35-37
12	FILE	2:09:54PM +/- 1s	5.E.10	East	Internal Fire / Broken Window	29-31, 35-36
12	FILE	2:09:54PM +/- 1s	5.E.10	East	External Fire / Broken Window	31-35
12	FILE	2:10:56PM +/- 1s	5.E.11	East	Internal Fire / Broken Window	29-31
12	FILE	2:10:56PM +/- 1s	5.E.11	East	External Fire / Broken Window	31-35
12	FILE	2:10:56PM +/- 1s	5.E.11	East	Smoke	35-36
12	FILE	2:11:09PM +/- 1s	5.E.12	East	External Fire / Broken Window	29-35
12	FILE	2:11:09PM +/- 1s	5.E.12	East	Smoke	35-37
12	FILE	2:11:19PM +/- 1s	5.E.13	East	External Fire / Broken Window	29-35
12	FILE	2:11:19PM +/- 1s	5.E.13	East	Smoke	35-37
12	FILE	2:11:26PM +/- 1s	5.E.14	East	Internal Fire / Broken Window	29-31
12	FILE	2:11:26PM +/- 1s	5.E.14	East	External Fire / Broken Window	31-35
12	FILE	2:11:26PM +/- 1s	5.E.14	East	Smoke	35-37
12	FILE	2:12:57PM +/- 1s	5.E.15	East	Internal Fire / Broken Window	29-30
12	FILE	2:12:57PM +/- 1s	5.E.15	East	External Fire / Broken Window	30-36
12	FILE	2:12:57PM +/- 1s	5.E.15	East	Burned-out	36-37
12	GNA	est 2:08PM-2:13PM	5.E.16	East	Internal Fire / Broken Window	29-30, 35-36
12	GNA	est 2:08PM-2:13PM	5.E.16	East	External Fire / Broken Window	30-35
12	GNA	est 2:08PM-2:13PM	5.E.16	East	Smoke	36-37
12	FILE	2:13:04PM +/- 1s	5.E.17	East	Internal Fire / Broken Window	29-31

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Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
12	FILE	2:13:04PM +/-1s	5.E.17	East	External Fire / Broken Window	31-36
12	FILE	2:13:04PM +/-1s	5.E.17	East	Smoke	36-37
12	GNA	est 2:08PM-2:28PM	5.E.18	East	External Fire / Broken Window	30-35
12	GNA	est 2:08PM-2:28PM	5.E.18	East	Internal Fire / Broken Window	35-36
12	GNA	est 2:08PM-2:28PM	5.E.18	East	Smoke	36-37
12	GNA	est 2:08PM-2:28PM	5.E.19	East	Internal Fire / Broken Window	29-30
12	GNA	est 2:08PM-2:28PM	5.E.19	East	External Fire / Broken Window	30-36
12	GNA	est 2:13PM-2:27PM	5.E.20	East	Internal Fire / Broken Window	28-30
12	GNA	est 2:13PM-2:27PM	5.E.20	East	External Fire / Broken Window	30-36
12	GNA	est 2:13PM-2:27PM	5.E.20	East	Smoke	36-37
12	FILE	2:14:09PM +/-1s	5.E.21	East	Smoke	28-29, 36-37
12	FILE	2:14:09PM +/-1s	5.E.21	East	External Fire / Broken Window	29-36
12	FILE	2:14:29PM +/-1s	5.E.22	East	Internal Fire / Broken Window	28-31
12	FILE	2:14:29PM +/-1s	5.E.22	East	External Fire / Broken Window	31-36
12	FILE	2:14:29PM +/-1s	5.E.22	East	Smoke	36-37
12	FILE	2:14:33PM +/-1s	5.E.23	East	Smoke	28-31, 36-37
12	FILE	2:14:33PM +/-1s	5.E.23	East	External Fire / Broken Window	31-35
12	FILE	2:14:33PM +/-1s	5.E.23	East	Internal Fire / Broken Window	35-36
12	GNA	est 2:13PM-2:28PM	5.E.24	East	Internal Fire / Broken Window	28-30
12	GNA	est 2:13PM-2:27PM	5.E.25	East	Internal Fire / Broken Window	28-31
12	GNA	est 2:13PM-2:27PM	5.E.25	East	External Fire / Broken Window	31-37
12	GNA	est 2:13PM-2:27PM	5.E.26	East	External Fire / Broken Window	28-36
12	GNA	est 2:13PM-2:27PM	5.E.26	East	Smoke	36-37
12	NIST	2:15PM-2:27PM	5.E.27	East	Smoke	28-29, 35-38
12	NIST	2:15PM-2:27PM	5.E.27	East	Internal Fire / Broken Window	29-30
12	NIST	2:15PM-2:27PM	5.E.27	East	External Fire / Broken Window	30-35
12	GNA	est 2:15PM-2:28PM	5.E.28	East	Smoke	28-29, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.28	East	External Fire / Broken Window	29-36
12	GNA	est 2:15PM-2:28PM	5.E.29	East	Smoke	28-29, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.29	East	External Fire / Broken Window	29-36
12	GNA	est 2:15PM-2:28PM	5.E.30	East	Internal Fire / Broken Window	28-29, 32-33
12	GNA	est 2:15PM-2:28PM	5.E.30	East	External Fire / Broken Window	29-32, 33-36
12	GNA	est 2:15PM-2:28PM	5.E.30	East	Smoke	36-38
12	GNA	est 2:15PM-2:28PM	5.E.31	East	Internal Fire / Broken Window	28-29
12	GNA	est 2:15PM-2:28PM	5.E.31	East	Smoke	29-30, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.31	East	External Fire / Broken Window	30-36
12	GNA	est 2:15PM-2:28PM	5.E.32	East	Internal Fire / Broken Window	28-32
12	GNA	est 2:15PM-2:28PM	5.E.32	East	External Fire / Broken Window	32-36
12	GNA	est 2:15PM-2:28PM	5.E.32	East	Smoke	36-38
12	GNA	est 2:15PM-2:28PM	5.E.33	East	Internal Fire / Broken Window	28-31, 33-34
12	GNA	est 2:15PM-2:28PM	5.E.33	East	Internal Fire / Broken Window	36-37
12	GNA	est 2:15PM-2:28PM	5.E.33	East	External Fire / Broken Window	31-33, 34-36
12	GNA	est 2:15PM-2:28PM	5.E.33	East	Smoke	37-38
12	GNA	est 2:15PM-2:28PM	5.E.34	East	Internal Fire / Broken Window	28-30, 33-34
12	GNA	est 2:15PM-2:28PM	5.E.34	East	Internal Fire / Broken Window	36-37
12	GNA	est 2:15PM-2:28PM	5.E.34	East	External Fire / Broken Window	30-33, 34-36
12	GNA	est 2:15PM-2:28PM	5.E.34	East	Smoke	37-38
12	GNA	est 2:15PM-2:28PM	5.E.35	East	Smoke	28-29, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.35	East	Internal Fire / Broken Window	29-30, 33-34
12	GNA	est 2:15PM-2:28PM	5.E.35	East	External Fire / Broken Window	30-33, 34-36
12	GNA	est 2:15PM-2:28PM	5.E.36	East	Smoke	28-29, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.36	East	Internal Fire / Broken Window	29-31, 32-33
12	GNA	est 2:15PM-2:28PM	5.E.36	East	External Fire / Broken Window	31-32, 33-36
12	GNA	est 2:15PM-2:28PM	5.E.37	East	Smoke	28-29, 37-38

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
12	GNA	est 2:15PM-2:28PM	5.E.37	East	Internal Fire / Broken Window	29-30, 32-35
12	GNA	est 2:15PM-2:28PM	5.E.37	East	Internal Fire / Broken Window	36-37
12	GNA	est 2:15PM-2:28PM	5.E.37	East	External Fire / Broken Window	30-32, 35-36
12	GNA	est 2:15PM-2:28PM	5.E.38	East	Internal Fire / Broken Window	28-30, 32-33
12	GNA	est 2:15PM-2:28PM	5.E.38	East	Internal Fire / Broken Window	34-36
12	GNA	est 2:15PM-2:28PM	5.E.38	East	External Fire / Broken Window	30-31, 33-34
12	GNA	est 2:15PM-2:28PM	5.E.38	East	Smoke	31-32, 36-38
12	GNA	est 2:15PM-2:28PM	5.E.39	East	Internal Fire / Broken Window	28-31, 33-36
12	GNA	est 2:15PM-2:28PM	5.E.39	East	Smoke	36-38
12	GNA	est 2:15PM-2:28PM	5.E.40	East	Internal Fire / Broken Window	28-30, 35-36
12	GNA	est 2:15PM-2:28PM	5.E.40	East	Smoke	36-38
12	GNA	est 2:15PM-2:28PM	5.E.41	East	Internal Fire / Broken Window	28-29, 30-34
12	GNA	est 2:15PM-2:28PM	5.E.41	East	External Fire / Broken Window	29-30, 34-37
12	GNA	est 2:15PM-2:28PM	5.E.41	East	Smoke	37-38
12	GNA	est 2:15PM-2:28PM	5.E.42	East	Internal Fire / Broken Window	28-31, 32-34
12	GNA	est 2:15PM-2:28PM	5.E.42	East	External Fire / Broken Window	31-32, 34-37
12	GNA	est 2:15PM-2:28PM	5.E.43	East	Internal Fire / Broken Window	28-32, 34-37
12	GNA	est 2:15PM-2:28PM	5.E.43	East	Smoke	32-34
12	GNA	est 2:15PM-2:28PM	5.E.44	East	Internal Fire / Broken Window	28-29, 30-34
12	GNA	est 2:15PM-2:28PM	5.E.44	East	External Fire / Broken Window	29-30, 34-35
12	GNA	est 2:15PM-2:28PM	5.E.45	East	Internal Fire / Broken Window	28-31, 33-35
12	GNA	est 2:15PM-2:28PM	5.E.47	East	Burned-out	28-29
12	GNA	est 2:15PM-2:28PM	5.E.47	East	Internal Fire / Broken Window	29-34
12	GNA	est 2:15PM-2:28PM	5.E.47	East	External Fire / Broken Window	34-36
12	GNA	est 2:15PM-2:28PM	5.E.47	East	Smoke	36-38
12	GNA	est 2:00PM-3:00PM	5.E.48	East	Smoke	?
12	GNA	est 2:00PM-3:00PM	5.E.48	East	External Fire / Broken Window	?
12	GNA	est 2:15PM-2:28PM	5.E.49	East	Internal Fire / Broken Window	28-29
12	GNA	est 2:15PM-2:28PM	5.E.49	East	Smoke	29-34, 37-38
12	GNA	est 2:15PM-2:28PM	5.E.49	East	External Fire / Broken Window	34-37
12	GNA	est 2:15PM-2:28PM	5.E.50	East	Internal Fire / Broken Window	28-29
12	GNA	est 2:15PM-2:28PM	5.E.50	East	Burned-out	29-34
12	GNA	est 2:15PM-2:28PM	5.E.50	East	External Fire / Broken Window	34-37
12	GNA	est 2:15PM-2:28PM	5.E.50	East	Smoke	37-38
12	GNA	est 2:00PM-3:00PM	5.E.51	East	Smoke	?
12	GNA	est 2:00PM-3:00PM	5.E.51	East	External Fire / Broken Window	?
12	GNA	est 2:15PM-2:28PM	5.E.52	East	External Fire / Broken Window	34-37
12	GNA	est 2:15PM-2:28PM	5.E.52	East	Smoke	37-38
12	FILE	2:28:43PM +/-1s	5.E.53	East	Internal Fire / Broken Window	28-30, 31-34
12	FILE	2:28:43PM +/-1s	5.E.53	East	Internal Fire / Broken Window	35-36
12	FILE	2:28:43PM +/-1s	5.E.53	East	External Fire / Broken Window	30-31, 34-35
12	FILE	2:28:43PM +/-1s	5.E.53	East	External Fire / Broken Window	36-37
12	FILE	2:28:43PM +/-1s	5.E.53	East	Smoke	37-38
12	GNA	est 2:28PM-3:10PM	5.E.54	East	Internal Fire / Broken Window	28-29, 31-34
12	GNA	est 2:28PM-3:10PM	5.E.54	East	Burned-out	29-31
12	GNA	est 2:28PM-3:10PM	5.E.54	East	External Fire / Broken Window	34-38
12	GNA	est 2:28PM-3:10PM	5.E.54	East	Smoke	38-39
12	NIST	2:57PM +/-300s	5.N.01	North	Internal Fire / Broken Window	44-46
12	NIST	3:05PM +/- 300s	6.N.01	North	Internal Fire / Broken Window	43-46
12	GNA	est 3:05PM-3:10PM	6.N.02	East	External Fire / Broken Window	39-40?
12	GNA	est 3:05PM-3:10PM	6.N.02	North	Internal Fire / Broken Window	42-46
12	GNA	est 3:05PM-3:10PM	6.N.03	East	External Fire / Broken Window	39-40?
12	GNA	est 3:05PM-3:10PM	6.N.03	North	Internal Fire / Broken Window	42-46
12	NIST	3:10PM +/-300s	6.N.04	East	External Fire / Broken Window	41-42

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
12	NIST	3:10PM +/-300s	6.N.04	North	Internal Fire / Broken Window	42-47
12	GNA	est 3:05PM-3:10PM	6.N.05	North	Internal Fire / Broken Window	42-43, 45-47
12	NIST	3:10:46PM +/-3s	6.N.06	North	Internal Fire / Broken Window	45-48
12	NIST	3:10:46PM-3:13:46PM	6.N.07	North	Internal Fire / Broken Window	45-48
12	GNA	est 3:10PM-3:17PM	6.N.08	North	Burned-out	44-46
12	GNA	est 3:10PM-3:17PM	6.N.08	North	Internal Fire / Broken Window	46-49
12	NIST	3:12:50PM +/-300s	6.N.09	North	Burned-out	44-46
12	NIST	3:12:50PM +/-300s	6.N.09	North	Internal Fire / Broken Window	46-49
12	NIST	3:11:15PM-3:16:51PM	6.N.10	North	Burned-out	45-46
12	NIST	3:11:15PM-3:16:51PM	6.N.10	North	Internal Fire / Broken Window	46-49
12	NIST	3:41PM +/-180s	6.N.12	North	Internal Fire / Broken Window	50-54
12	NIST	3:42:30PM +/-120s	6.N.13	North	Burned-out	45-48, 49-50
12	NIST	3:42:30PM +/-120s	6.N.13	North	Internal Fire / Broken Window	50-52
12	NIST	around 3:42PM +/-300s	6.N.14	North	Burned-out	50-54
12	NIST	3:44PM +/-240s	6.N.15	North	Burned-out	42-51, 52-54
12	NIST	3:44PM +/-240s	6.N.15	North	Internal Fire / Broken Window	51-52, 55-56
12	NIST	3:50:13PM +/-180s	6.N.16	North	Internal Fire / Broken Window	50-53
12	NIST	3:49PM-3:54PM	6.N.17	North	Burned-out	42-51, 53-54
12	NIST	3:49PM-3:54PM	6.N.17	North	Internal Fire / Broken Window	51-53
12	NIST	3:51PM-3:58PM	6.N.19	North	Burned-out	43-52, 53-54
12	NIST	3:51PM-3:58PM	6.N.19	North	Internal Fire / Broken Window	52-53
12	NIST	3:54:14PM +/-210s	6.N.20	North	Burned-out	50-51
12	NIST	3:54:14PM +/-210s	6.N.20	North	Internal Fire / Broken Window	51-53
12	NIST	near 3:55PM	6.N.21	North	Burned-out	44-55
12	NIST	3:53PM-4:02PM	6.N.22	North	Burned-out	42-48
12	NIST	3:55PM-4:04PM	6.N.23	North	Burned-out	42-45
12	NIST	likely 4:15PM	7.N.02	North	Internal Fire / Broken Window	51-52
12	GNA	est 4:15PM-4:38PM	7.N.04	North	Internal Fire / Broken Window	51-52
12	GNA	est 4:15PM-4:38PM	7.E.03	North	Burned-out	42-43
12	GNA	est 4:15PM-4:38PM	7.E.04	North	Burned-out	42-43
12	NIST	4:38:14PM +/-1s	7.N.06	North	Burned-out	44-48
12	NIST	around 5:00PM +/-600s	8.N.01	North	Burned-out	54-57
12	NIST	around 5:00PM +/-600s	8.N.01	North	Internal Fire / Broken Window	57-1
11	GNA	est 2:00PM-2:08PM	5.E.02	East	Burned-out	29-31
11	GNA	est 2:00PM-2:08PM	5.E.03	East	Burned-out	29-31
11	GNA	est 2:00PM-2:08PM	5.E.04	East	Burned-out	29-30
11	GNA	est 2:00PM-2:08PM	5.E.04	East	Internal Fire / Broken Window	30-31
11	GNA	est 2:00PM-2:08PM	5.E.05	East	Internal Fire / Broken Window	29-31
11	GNA	est 2:00PM-2:08PM	5.E.06	East	Internal Fire / Broken Window	29-31
11	GNA	est 2:00PM-2:08PM	5.E.07	East	Internal Fire / Broken Window	29-31
11	FILE	2:08:28PM +/-1s	5.E.08	East	Internal Fire / Broken Window	29-31
11	FILE	2:08:45PM +/-1s	5.E.09	East	Burned-out	29-30
11	FILE	2:08:45PM +/-1s	5.E.09	East	Internal Fire / Broken Window	30-31
11	FILE	2:09:54PM +/-1s	5.E.10	East	Internal Fire / Broken Window	29-31
11	FILE	2:10:56PM +/-1s	5.E.11	East	Internal Fire / Broken Window	29-31
11	FILE	2:11:09PM +/-1s	5.E.12	East	Internal Fire / Broken Window	29-30
11	FILE	2:11:09PM +/-1s	5.E.12	East	Burned-out	30-31
11	FILE	2:11:19PM +/-1s	5.E.13	East	Internal Fire / Broken Window	29-31
11	FILE	2:11:26PM +/-1s	5.E.14	East	Internal Fire / Broken Window	29-31
11	FILE	2:12:57PM +/-1s	5.E.15	East	Burned-out	29-30
11	FILE	2:12:57PM +/-1s	5.E.15	East	Internal Fire / Broken Window	30-31
11	GNA	est 2:08PM-2:13PM	5.E.16	East	Internal Fire / Broken Window	29-31
11	FILE	2:13:04PM +/-1s	5.E.17	East	Burned-out	29-31

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
11	GNA	est 2:08PM-2:28PM	5.E.18	East	Burned-out	29-31
11	GNA	est 2:08PM-2:28PM	5.E.19	East	Burned-out	29-31
11	GNA	est 2:13PM-2:27PM	5.E.20	East	Internal Fire / Broken Window	29-30
11	GNA	est 2:13PM-2:27PM	5.E.20	East	Burned-out	30-31
11	FILE	2:14:09PM +/- 1s	5.E.21	East	Burned-out	29-31
11	FILE	2:14:29PM +/- 1s	5.E.22	East	Burned-out	29-31
11	FILE	2:14:33PM +/- 1s	5.E.23	East	Burned-out	29-31
11	GNA	est 2:13PM-2:28PM	5.E.24	East	Burned-out	29-31
11	GNA	est 2:13PM-2:27PM	5.E.25	East	Burned-out	29-31
11	GNA	est 2:13PM-2:27PM	5.E.26	East	Internal Fire / Broken Window	29-31
11	NIST	2:15PM-2:27PM	5.E.27	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.28	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.29	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.30	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.30	East	Internal Fire / Broken Window	32-33
11	GNA	est 2:15PM-2:28PM	5.E.31	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.31	East	Internal Fire / Broken Window	32-33
11	GNA	est 2:15PM-2:28PM	5.E.32	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.32	East	Internal Fire / Broken Window	31-34
11	GNA	est 2:15PM-2:28PM	5.E.33	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.33	East	Internal Fire / Broken Window	31-34
11	GNA	est 2:15PM-2:28PM	5.E.33	East	External Fire / Broken Window	34-35
11	GNA	est 2:15PM-2:28PM	5.E.34	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.34	East	Internal Fire / Broken Window	31-34
11	GNA	est 2:15PM-2:28PM	5.E.34	East	External Fire / Broken Window	34-35
11	GNA	est 2:15PM-2:28PM	5.E.35	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.35	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:15PM-2:28PM	5.E.36	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.36	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:15PM-2:28PM	5.E.37	East	Burned-out	29-31, 34-35
11	GNA	est 2:15PM-2:28PM	5.E.37	East	Internal Fire / Broken Window	31-34
11	GNA	est 2:15PM-2:28PM	5.E.38	East	Burned-out	29-30
11	GNA	est 2:15PM-2:28PM	5.E.38	East	Smoke?	30-31
11	GNA	est 2:15PM-2:28PM	5.E.38	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:15PM-2:28PM	5.E.39	East	Burned-out	29-30
11	GNA	est 2:15PM-2:28PM	5.E.39	East	Smoke	30-31
11	GNA	est 2:15PM-2:28PM	5.E.39	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:15PM-2:28PM	5.E.40	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.40	East	Internal Fire / Broken Window	31-32, 33-35
11	GNA	est 2:15PM-2:28PM	5.E.40	East	External Fire / Broken Window	32-33
11	GNA	est 2:15PM-2:28PM	5.E.41	East	Internal Fire / Broken Window	29-30, 31-34
11	GNA	est 2:15PM-2:28PM	5.E.41	East	Burned-out	30-31
11	GNA	est 2:15PM-2:28PM	5.E.41	East	External Fire / Broken Window	34-35
11	GNA	est 2:15PM-2:28PM	5.E.42	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.42	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:15PM-2:28PM	5.E.43	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.43	East	Internal Fire / Broken Window	31-33
11	GNA	est 2:15PM-2:28PM	5.E.43	East	External Fire / Broken Window	33-35
11	GNA	est 2:15PM-2:28PM	5.E.44	East	Burned-out	29-32
11	GNA	est 2:15PM-2:28PM	5.E.44	East	Internal Fire / Broken Window	32-35
11	GNA	est 2:15PM-2:28PM	5.E.45	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.45	East	Internal Fire / Broken Window	31-33
11	GNA	est 2:15PM-2:28PM	5.E.45	East	External Fire / Broken Window	33-34
11	GNA	est 2:15PM-2:28PM	5.E.45	East	Smoke	34-35

Guy Nordenson and Associates

Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
11?	GNA	est 2:00PM-3:00PM	5.E.46	East	External Fire / Broken Window	?
11	GNA	est 2:15PM-2:28PM	5.E.47	East	Burned-out	29-31
11	GNA	est 2:15PM-2:28PM	5.E.47	East	Internal Fire / Broken Window	31-32
11	GNA	est 2:15PM-2:28PM	5.E.47	East	Smoke	32-35
11	GNA	est 2:00PM-3:00PM	5.E.48	East	Smoke	?
11	GNA	est 2:15PM-2:28PM	5.E.49	East	Internal Fire / Broken Window	29-30, 31-35
11	GNA	est 2:15PM-2:28PM	5.E.49	East	Burned-out	30-31
11	GNA	est 2:15PM-2:28PM	5.E.50	East	Internal Fire / Broken Window	29-30, 31-35
11	GNA	est 2:15PM-2:28PM	5.E.50	East	Burned-out	30-31
11	GNA	est 2:15PM-2:28PM	5.E.52	East	Internal Fire / Broken Window	32-35
11	FILE	2:28:43PM +/-1s	5.E.53	East	Burned-out	29-31
11	FILE	2:28:43PM +/-1s	5.E.53	East	Internal Fire / Broken Window	31-35
11	GNA	est 2:28PM-3:10PM	5.E.54	East	Burned-out	29-31
11	GNA	est 2:28PM-3:10PM	5.E.54	East	Internal Fire / Broken Window	31-33, 36-37
11	GNA	est 2:28PM-3:10PM	5.E.54	East	External Fire / Broken Window	33-36
11	NIST	4:38:14PM +/-1s	7.N.06	North	Internal Fire / Broken Window	44-47
11	NIST	likely 4:39PM +/-120s	7.N.07	North	Internal Fire / Broken Window	45-49
11	GNA	est 5:00PM-5:09PM	8.N.02	North	Internal Fire / Broken Window	48-50
11	NIST	5:09:03PM +/-120s	8.N.03	North	Internal Fire / Broken Window	48-50
11	GNA	est 5:09PM-5:19PM	8.N.04	North	Internal Fire / Broken Window	49-51
11	NIST	5:19:45PM +/-120s	8.N.05	North	Internal Fire / Broken Window	50-52
11	NIST	5:20:17PM +/-15s	8.N.06	North	Internal Fire / Broken Window	49-52
9	NIST	near 3:55PM	6.N.21	North	Internal Fire / Broken Window	54-55
9	NIST	4:10PM +/-300s	7.N.01	North	Internal Fire / Broken Window	49-50, 51-53
9	NIST	likely 4:15PM	7.N.02	North	Internal Fire / Broken Window	45-50, 52-53
9	GNA	est 4:15PM-4:38PM	7.N.03	North	Internal Fire / Broken Window	45-50, 52-53
9	GNA	est 4:15PM-4:38PM	7.N.04	North	Internal Fire / Broken Window	45-48
9	GNA	est 4:15PM-4:38PM	7.E.03	East	Internal Fire / Broken Window	41-42
9	GNA	est 4:15PM-4:38PM	7.E.03	North	Internal Fire / Broken Window	42-43
9	GNA	est 4:15PM-4:38PM	7.E.04	East	Internal Fire / Broken Window	41-42
9	GNA	est 4:15PM-4:38PM	7.E.04	North	Internal Fire / Broken Window	42-43
9	NIST	4:38:11PM +/-1s	7.N.05	North	Burned-out	44-45, 46-48
9	NIST	4:38:11PM +/-1s	7.N.05	North	Internal Fire / Broken Window	45-46
9	NIST	4:38:14PM +/-1s	7.N.06	North	Burned-out	44-48
9	NIST	likely 4:39PM +/-120s	7.N.07	North	Internal Fire / Broken Window	45-47
9	NIST	likely 4:39PM +/-120s	7.N.07	North	Burned-out	47-49
8	GNA	est 3:20PM-3:40PM	6.E.01	North	Smoke	42-43
8	NIST	likely 3:20PM-3:40PM	6.E.02	North	Smoke	42-43
8?	GNA	est 3:20PM-3:40PM	6.E.03	North	Smoke	42-43?
8?	GNA	est 3:20PM-3:40PM	6.E.04	North	Smoke	42-43?
8	NIST	3:41:30PM +/-300s	6.W.32	West	Internal Fire / Broken Window	2-3, 4-6
8	NIST	3:41:30PM +/-300s	6.W.32	West	External Fire / Broken Window	3-4
8	NIST	3:41PM +/-180s	6.N.12	North	Internal Fire / Broken Window	47-54
8	NIST	3:42:30PM +/-120s	6.N.13	North	Internal Fire / Broken Window	47-52
8	NIST	around 3:42PM +/-300s	6.N.14	North	Internal Fire / Broken Window	51-52
8	NIST	around 3:42PM +/-300s	6.N.14	North	Burned-out	52-1
8	NIST	around 3:42PM +/-300s	6.N.14	West	Smoke	1-5, 6-8
8	NIST	around 3:42PM +/-300s	6.N.14	West	External Fire / Broken Window	5-6
8	NIST	3:44PM +/-240s	6.N.15	North	Internal Fire / Broken Window	47-48, 49-51
8	NIST	3:44PM +/-240s	6.N.15	North	External Fire / Broken Window	48-49
8	NIST	3:44PM +/-240s	6.N.15	North	Burned-out	51-57
8	NIST	3:50:13PM +/-180s	6.N.16	North	Internal Fire / Broken Window	46-52

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Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
8	NIST	3:49PM-3:54PM	6.N.17	North	Internal Fire / Broken Window	43-52
8	NIST	3:49PM-3:54PM	6.N.17	North	Burned-out	51-55
8	NIST	3:49:30PM-3:54:30PM	6.N.18	North	Internal Fire / Broken Window	45-50
8	NIST	3:51PM-3:58PM	6.N.19	North	External Fire / Broken Window	44-45
8	NIST	3:51PM-3:58PM	6.N.19	North	Internal Fire / Broken Window	46-52
8	NIST	3:51PM-3:58PM	6.N.19	North	Burned-out	51-53
8	NIST	3:54:14PM +/-210s	6.N.20	North	Internal Fire / Broken Window	45-52
8	NIST	near 3:55PM	6.N.21	North	Internal Fire / Broken Window	43-51
8	NIST	near 3:55PM	6.N.21	North	Burned-out	51-55
8	NIST	3:53PM-4:02PM	6.N.22	North	Smoke	42-44
8	NIST	3:53PM-4:02PM	6.N.22	North	Internal Fire / Broken Window	44-46
8	NIST	3:55PM-4:04PM	6.N.23	East	External Fire / Broken Window	41-42
8	NIST	3:55PM-4:04PM	6.N.23	North	Smoke	42-43
8	NIST	3:55PM-4:04PM	6.N.23	North	Internal Fire / Broken Window	42-45
8	NIST	3:55PM-4:04PM	6.N.23	North	Burned-out	45-46
8	GNA	est 3:55PM-4:04PM	6.N.24	East	External Fire / Broken Window	41-42
8	GNA	est 3:55PM-4:04PM	6.N.24	North	Smoke	42-43
8	GNA	est 3:55PM-4:04PM	6.N.25	East	External Fire / Broken Window	41-42
8	GNA	est 3:55PM-4:04PM	6.N.25	North	Smoke	42-43
8	GNA	est 3:55PM-4:04PM	6.N.25	North	Internal Fire / Broken Window	42-45
8	NIST	4:10PM +/-300s	7.N.01	North	Internal Fire / Broken Window	45-49
8	NIST	4:10PM +/-300s	7.N.01	North	Burned-out	49-54
8	NIST	likely 4:15PM	7.N.02	North	Internal Fire / Broken Window	48-49
8	GNA	est 4:15PM-4:38PM	7.E.03	North	Burned-out	42-43
8	GNA	est 4:15PM-4:38PM	7.E.04	East	External Fire / Broken Window	29-34?
8	GNA	est 4:15PM-4:38PM	7.E.04	North	Burned-out	42-43
8	NIST	4:38:11PM +/-1s	7.N.05	North	Burned-out	44-48
8	NIST	likely 4:39PM +/-120s	7.N.07	North	Internal Fire / Broken Window	45-47
8	NIST	likely 4:39PM +/-120s	7.N.07	North	Burned-out	47-49
7	NIST	1:30PM-2:30PM	4.W.10	West	Smoke	2-3, 5-9
7	NIST	1:30PM-2:30PM	4.W.10	West	Burned-out	9-11
7	GNA	est 1:30PM-2:30PM	4.W.11	West	Smoke	2-3, 5-8
7	GNA	est 1:30PM-2:30PM	4.W.11	West	Burned-out?	8-9
7	GNA	est 1:30PM-2:30PM	4.W.12	West	Smoke	2-3, 5-8?
7	GNA	est 1:30PM-2:30PM	4.W.12	West	Burned-out?	8-9
7	GNA	est 1:30PM-2:30PM	4.W.13	West	Smoke	4-6
7	GNA	est 1:30PM-2:30PM	4.W.13	West	Burned-out	6-11
7	FILE	2:21:10PM	5.W.07	North	Burned-out	56-1
7	FILE	2:21:10PM	5.W.07	West	Burned-out	1-3
7	FILE	2:21:10PM	5.W.07	West	Smoke	3-5
7	NIST	2:57PM +/-300s	5.N.01	North	Internal Fire / Broken Window	50-53, 54-55
7	GNA	est 3:00PM-4:30PM	6.W.17	West	Burned-out	5-11
7	GNA	est 3:00PM-4:30PM	6.W.18	West	Burned-out	5-11
7	NIST	3:05PM +/- 300s	6.N.01	North	Internal Fire / Broken Window	49-51, 52-53
7	NIST	3:05PM +/- 300s	6.N.01	North	Internal Fire / Broken Window	54-55
7	GNA	est 3:05PM-3:10PM	6.N.02	North	Internal Fire / Broken Window	49-55, 56-57
7	GNA	est 3:05PM-3:10PM	6.N.03	North	Internal Fire / Broken Window	49-51, 52-55
7	GNA	est 3:05PM-3:10PM	6.N.03	North	Internal Fire / Broken Window	56-57
7	GNA	est 3:05PM-3:10PM	6.N.05	North	Internal Fire / Broken Window	48-50, 54-55
7	NIST	3:10:46PM +/-3s	6.N.06	North	Internal Fire / Broken Window	47-50
7	NIST	3:10:46PM-3:13:46PM	6.N.07	North	Internal Fire / Broken Window	47-50
7	GNA	est 3:10PM-3:17PM	6.N.08	North	Internal Fire / Broken Window	47-51
7	NIST	3:12:50PM +/-300s	6.N.09	North	Internal Fire / Broken Window	47-51

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Floor Level	Time Source	Time	Photo	Façade	Type of Visible Damage	Column Lines
7	NIST	3:41PM +/-180s	6.N.12	North	Burned-out	47-54
7	NIST	3:41:30PM +/-300s	6.W.32	West	Burned-out	1-3
7	NIST	3:42:30PM +/-120s	6.N.13	North	Burned-out	48-50
7	NIST	around 3:42PM +/-300s	6.N.14	North	Burned-out	51-1
7	NIST	around 3:42PM +/-300s	6.N.14	West	Burned-out?	3-10
7	NIST	3:44PM +/-240s	6.N.15	North	Burned-out	47-57
7	NIST	3:50:13PM +/-180s	6.N.16	North	Burned-out	48-50
7	NIST	3:49PM-3:54PM	6.N.17	North	Burned-out	47-55
7	NIST	3:49:30PM-3:54:30PM	6.N.18	North	Burned-out	47-50
7	NIST	3:51PM-3:58PM	6.N.19	North	Burned-out	47-52
7	NIST	near 3:55PM	6.N.21	North	Burned-out	50-54
7?	GNA	est after 4:00PM	7.E.01	East	External Fire / Broken Window?	41-42?
7	NIST	4:10PM +/-300s	7.N.01	North	Burned-out	49-51
7	NIST	likely 4:15PM	7.N.02	North	Internal Fire / Broken Window	46-47
7	GNA	est 4:15PM-4:38PM	7.E.04	East	External Fire / Broken Window	29-33?
7	NIST	4:38:11PM +/-1s	7.N.05	North	Burned-out	44-45, 46-48
7	NIST	4:38:11PM +/-1s	7.N.05	North	Internal Fire / Broken Window	45-46
7	NIST	likely 4:39PM +/-120s	7.N.07	North	Burned-out	45-46, 47-48
7	NIST	likely 4:39PM +/-120s	7.N.07	North	Internal Fire / Broken Window	46-47
6	NIST	3:55PM-4:04PM	6.N.23	East	Smoke	40-41?
6?	GNA	est after 4:00PM	7.E.02	East	Smoke	36-39?
6	GNA	est 4:15PM-4:38PM	7.E.04	East	Smoke	36-39?
5	FILE	2:13:04PM +/-1s	5.E.17	East	Smoke	37-38

Exhibit C

World Trade Center 7

Floor 12 Fire Effects Simulation

Prepared by Ove Arup & Partners Consulting Engineers PC

Dated: February 15, 2010

(Attached as separate document)

Gennet, Kallmann, Antin
& Robinson, PC

World Trade Center 7

Floor 12 Fire Effects
Simulation

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February 2010

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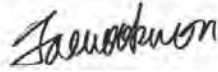



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Signature					

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Appendices

Appendix A – Run Log

Appendix B – Wind Conditions

Appendix C – Temperature Data East of Building Core

Appendix D – Fire Dynamic Simulator (FDS)

Executive Summary

The Fire Dynamics Simulator (FDS) model v5.3.1 developed by the National Institute of Standards and Technology (NIST) has been used to simulate fire conditions on Floor 12 of World Trade Center 7 (WTC7). Available photographic evidence of the fires in WTC7 was used along with information regarding the layout of Floor 12 as the basis of these simulations.

The FDS model simulated a seven hour fire event, starting from approximately 10:30 a.m., corresponding to the time at which World Trade Center 1 collapsed, to 5:30 p.m., roughly the time at which WTC7 collapsed. An initiating fire was located in the area of the southwest corner of the building, the portion of the building most heavily damaged, based on visual evidence, from the collapse of World Trade Center 1.

The simulated results agree reasonably well, on a visual/qualitative basis, with the photographic evidence available for the east and north facades of the building. The modeled fire originated in the southwest corner, spread along the south façade, reaching the southeast corner around 2:00 p.m. This is in good agreement with the visual evidence which suggests the first evidence of fire and thermally induced failure of windows in the southeast corner at roughly 2:08 p.m. Subsequently, the fires progressed counterclockwise to the northwest corner of the building from the southeast corner between 2:08 p.m. and 5:00 p.m. The travelling nature of the simulated fire was driven largely by the pre-programmed failure of windows at simulation times corresponding to the available photographic evidence.

- Notable discrepancies between the simulation results and the photographic evidence occur along the west façade of the building. The FDS results indicated substantial flame and smoke along the west facade, while there was no visual evidence of smoke or flame to support the simulated results. The discrepancies may be due to:
- Windows assumed to be open may not be represented properly (identified as “broken” in photographic evidence but may actually be louvers or grilles).
- Excessively high modeled fuel loads along the west side of the building; most of this area was not individual offices but rather reading/conference rooms or high density file space.
- Combustible items that existed on the southwest corner may have been damaged or disturbed by the debris from the collapse of WTC 1; this area may have then acted as a fire break limiting flame spread beyond this point.
- The venting of the southwest corner may be under-represented. Only the window area has been removed from the model whereas the actual debris damage from the collapse of WTC 1 was more extensive.
- The state of the individual room partitions and doors on the day of the event may vary from the manner in which they were modeled thereby limiting available oxidizer for combustion.

The discrepancy between the modeled and actual combustion along the west façade is not expected to significantly influence the conditions in the area of interest, east of the building core. The combustion along the west façade is sufficiently removed to have limited effect on the thermal exposure experienced on the opposite side of the building.

Chapter 1 of this report introduces a sampling of physical evidence including available drawings, photographic evidence of debris damage and thermally induced window failure, as well as the documented timeline of key events in the course of the day. This evidence serves as a basis of the modeling undertaken and described herein.

Chapter 2 describes the modeling methodology and the assumptions made. The model geometry and the computational domain are described. Details are given regarding the initiating design fire and the fuel load, including the fuel “target” properties which are a key aspect of the flame spread and fire progression as modeled in this study. Information is also given in Chapter 3 regarding the techniques employed to (1) apply the prevailing wind conditions, (2) simulating window breakage in time with the photographic evidence, and (3) simulating failure of the suspended ceiling system.

The results of the analysis are provided in four parts in Chapter 3 of this report. The first aspect of the results that are discussed are the visual or qualitative comparison of the simulated conditions to the photographic evidence. This evaluation of conditions evident around the building exterior provides some degree of verification that the simulated results are consistent with the available evidence. Temperature contours of the results are then provided to illustrate the progression of the fire across the 12th floor and to give an indication of the temperature conditions throughout the floor. The third component of the results is a more in depth evaluation of the conditions east of the building core. Recorded data from temperature probes east of the core within the model have been averaged to provide time-temperature profiles that cover an area consistent with that evaluated in structural fire analyses of the building. The final aspect of the results is an idealized thermal exposure profile developed based on the averaged simulation data.

Chapter 4 summarizes the work presented within this report, highlighting the objectives of the study and how the data may be used in substantiating assumptions made in the structural fire analyses of the WTC7 collapse.

1 Introduction

1.1 Building Description

World Trade Center 7 (WTC 7) was a 47-story steel-framed fire resistive building located north of the primary World Trade Center site. The building was trapezoidal in shape bounded by West Broadway, Barclay, Washington, and Vesey Streets. The long side of the building was approximately 329 feet in length; the shorter of the parallel sides was approximately 247 feet; the building was roughly 144 feet deep (See Figure 1) [1]. WTC 7 was approximately 355 feet from the North Tower, Tower 1, of the World Trade Center.

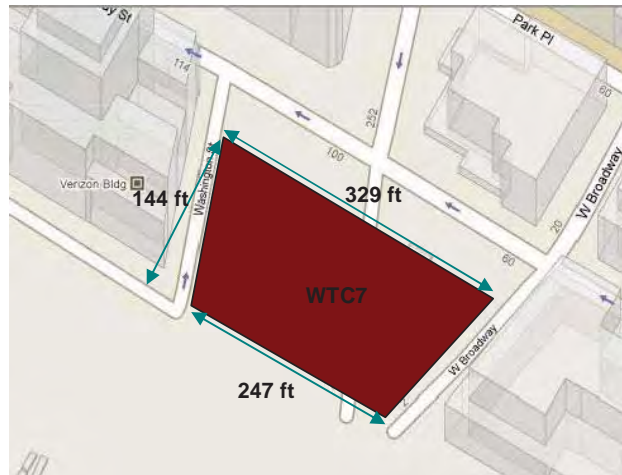
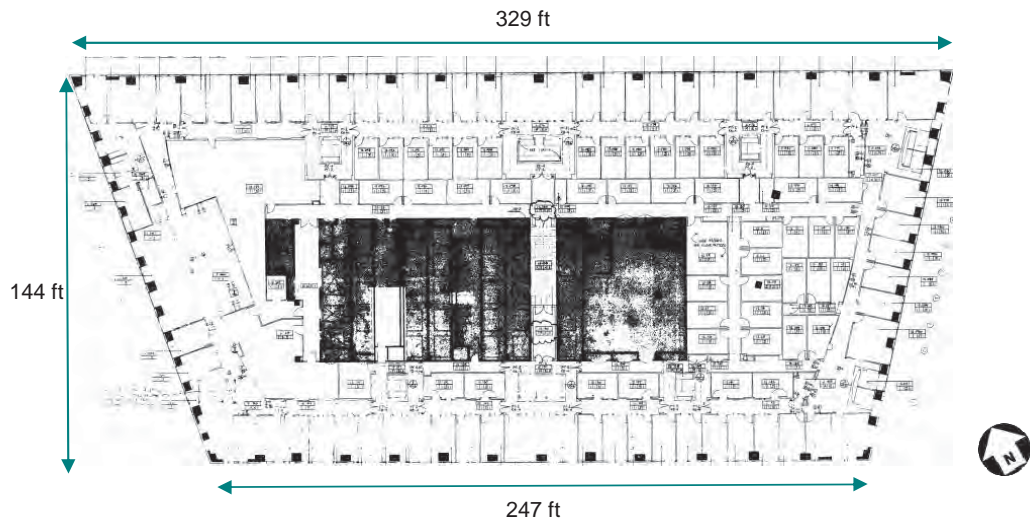
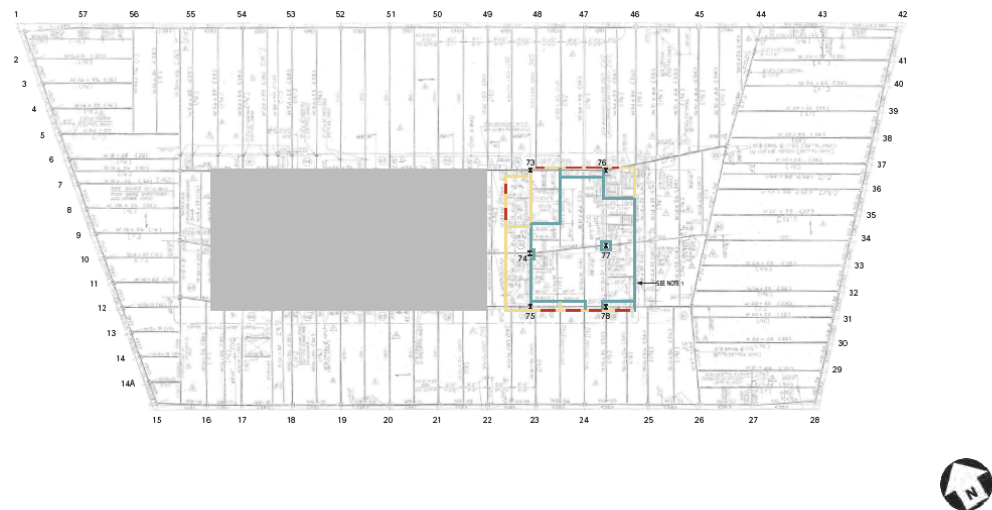


Figure 1 - World Trade Center 7 site plan

As shown in Figure 2 and Figure 3, the tenant space on Floor 12 was partitioned into individual office space by unrated walls. The partition walls ran from the top of the floor slab to some height above the suspended ceiling, but below the floor slab above. The doors in the interior walls were typically not equipped with self closing devices. The building core contained elevators, elevator lobbies, restrooms, stairwells, and HVAC shafts. The core elements are understood to have been fire-separated by gypsum wallboard walls, extending from the top of the floor slab to the underside of the floor slab above. Self-closing/automatic-closing doors are believed to have been provided in the fire-separated walls of the building core.

The distance from the top of the floor slab to the bottom of the floor slab above was approximately 12 feet 3 inches. The approximate height from the floor to the suspended ceiling height was 8 feet 6 inches. The floor slab thickness was approximately 6 inches.

The windows along the north/south sides and the east/west sides were arranged differently and are schematically shown in Figure 4 and Figure 5, respectively.

Figure 2 – 12th Floor planFigure 3 – 12th Floor plan showing the extent of the fire-rated core

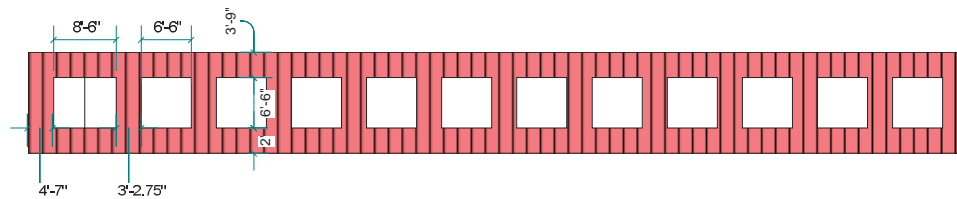


Figure 4 – East/west façade configuration

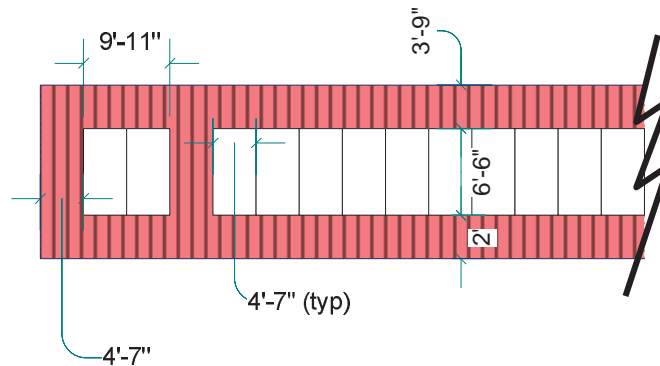


Figure 5 – North/south façade configuration

1.2 Event Timeline

A timeline of events in WTC 7 on September 11, 2001 is summarized in Table 1[2] [3].

Table 1 – Timeline of Events in WTC 7 on 11 September, 2001 (Floor 12)

Time	Event
10:28 a.m.	<ul style="list-style-type: none"> - Debris from the collapse of WTC 1 struck the west and south facades of the WTC 7 building. - Falling debris results in window breakage and structural damage.
1:00 p.m. - 2:00 p.m.	<ul style="list-style-type: none"> - Smoke was observed on the west façade.
2:08 p.m.	<ul style="list-style-type: none"> - First visible fire on the east façade toward the south through a broken window.
2:28 p.m.	<ul style="list-style-type: none"> - Fire was seen to move toward the north and south to the south-east corner.
2:57 p.m.	<ul style="list-style-type: none"> - Fire was first seen on the north façade toward the east.
3:10 p.m.	<ul style="list-style-type: none"> - Fire observed on the north façade traveled to both the east and west.
3:41 p.m.	<ul style="list-style-type: none"> - Fire progressed to the western half of the north façade.
4:15 p.m.	<ul style="list-style-type: none"> - Fire traveled further to the north-west side.
5:00 p.m.	<ul style="list-style-type: none"> - Fire reached the north-west corner of the building.
5:21 p.m.	<ul style="list-style-type: none"> - WTC 7 collapses approximately 7 hours after the collapse of WTC 1.

1.3 Photographic Evidence

1.3.1 Debris Damage

The south and west façades were damaged by the falling debris originating from the collapses of the WTC 1 and 2 Towers. The debris damage was analyzed by Guy Nordenson and Associates (GNA) [2] and are reproduced below in Figure 6.

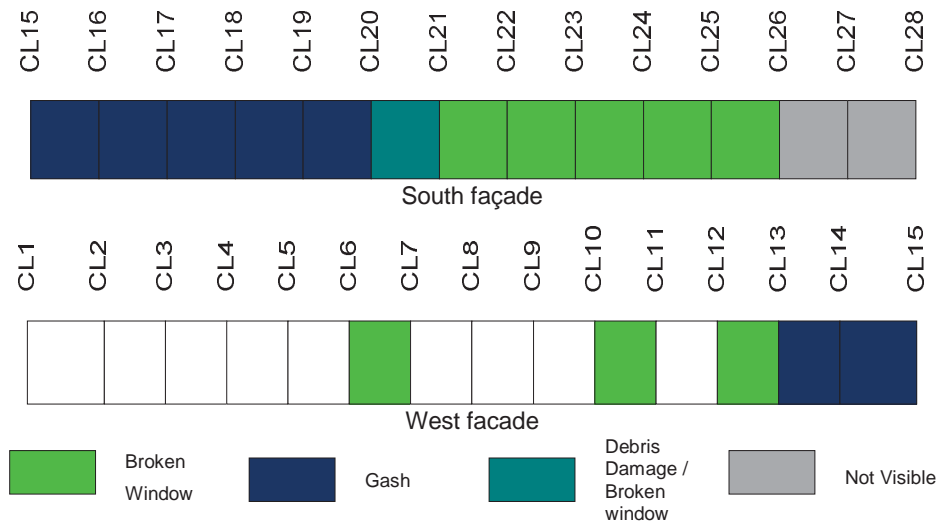


Figure 6 – South and west façades showing damages due to debris [2]

1.3.2 Thermal Failure

The visual progression of the fire across the 12th floor was developed based on scrutiny of photographic evidence taken of WTC7 through the day. The photographic evidence, shown in Figure 7 was carried out by GNA [3]. The fire was first observed on the east façade around 2:08 p.m; the fire then moved west along the north façade. The fire reached the northwest corner, prior to the observed time of building collapse. The south side was not visible throughout most of the day due to smoke obscuration. No fire was observed along the west façade on the 12th Floor.

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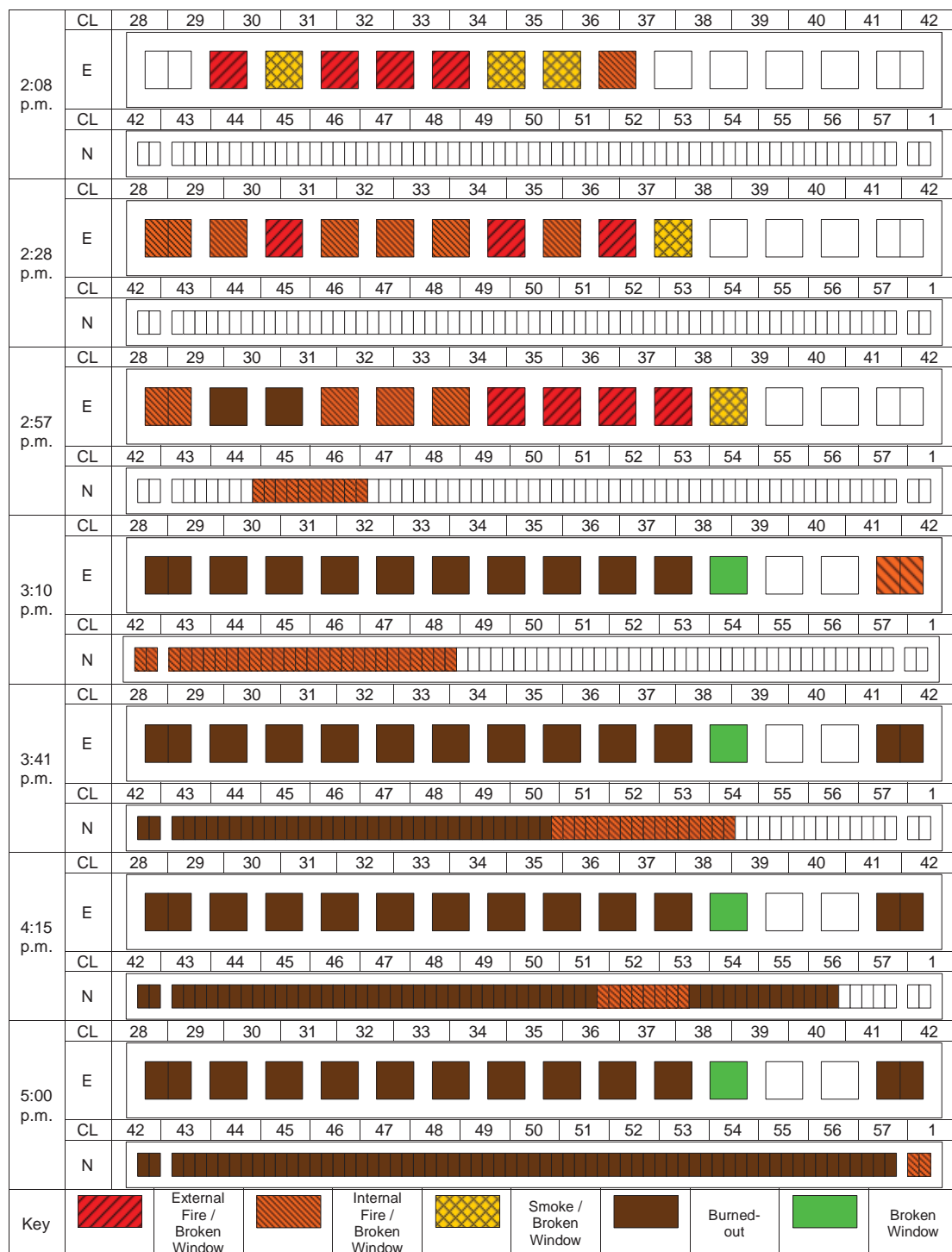
World Trade Center 7
Floor 12 Fire Effects Simulation

Figure 7 – Visual Evidence along East and North façades from 02:08 p.m. to 05:00 p.m.

2 CFD Model Input for Floor 12 Fires

2.1 Approach

Fire Dynamics Simulator (FDS) model v5.3.1, developed by the National Institute of Standards and Technology (NIST), has been used to simulate fire conditions on Floor 12 of World Trade Center 7 (WTC7). An overview of FDS is provided in Appendix D. Photographic evidence of the fires was used along with information regarding the layout of Floor 12 as the basis of these simulations, particularly with respect to the time to window breakage and the evidence of fire visible around the perimeter of the building.

A seven hour fire event has been simulated, starting from approximately 10:30 a.m. to 5:30 p.m., corresponding to the appropriate times of the collapse of World Trade Center 1 (WTC1) and WTC7, respectively. An initiating fire was located within the model to initiate fire spread. Openings around the perimeter of the floor were created at the beginning of the simulation to represent the damage (broken windows, etc.) due to the collapse of WTC1. The failure or breakage of additional windows was entered as an a priori input to coordinate with the photographic evidence.

2.2 Geometry

A CFD domain was constructed to represent Floor 12 as described in Section 1.1. The geometry of the floor was based on the Securities and Exchange Commission Tenant drawings received from GNA. To approximate the effects of the prevailing wind on September 11, 2001, the domain was extended approximately 90 feet to 150 feet beyond the building facades. The extent of the domain is depicted in Figure 8.

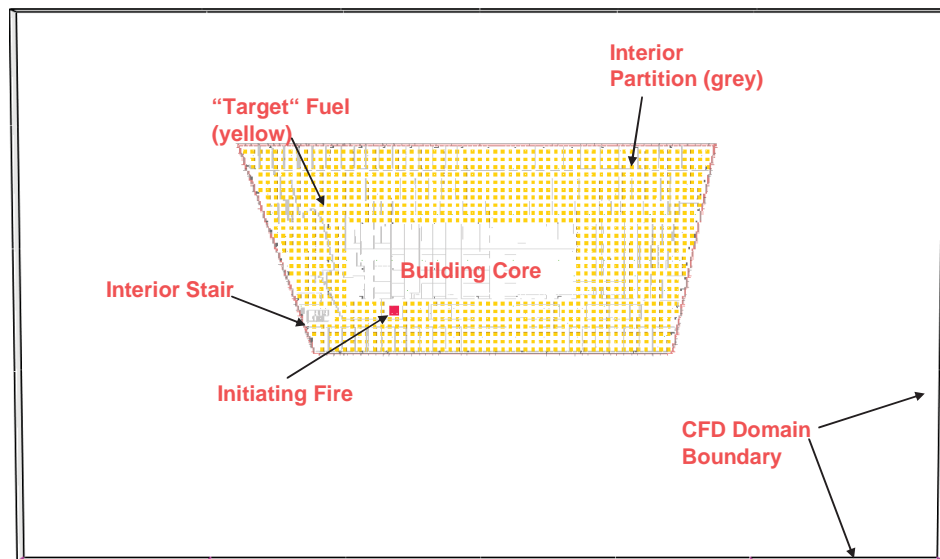


Figure 8 – Rendering of CFD computational domain

The doors in the interior walls were not equipped with self closing devices. During the events of September 11, 2001, it is not known whether these doors were left open while the occupants evacuated. All doors associated with the tenant spaces have been modeled to be open throughout the simulations. It has also been assumed that the core of the building was not breached by the debris and the integrity of the core walls and the doors was maintained throughout the simulation.

2.3 Grid Resolution

A grid resolution of 1.3 ft x 1.3 ft x 0.65 ft high (0.4 m x 0.4 m x 0.2 m) has been utilized. This grid size was selected to provide a balance between computational cost and resolution. Due to the grid resolution, some physical dimensions were adjusted to conform to the underlying grid. An evaluation was carried out to make sure that these adjustments would not significantly alter key geometric characteristics, such as the size of the (broken) windows.

A comprehensive grid sensitivity analysis has not been undertaken; the grid utilized was deemed to be of an acceptable level of refinement necessary for the simulations.

2.4 Window Breakage

2.4.1 Debris Damage

All windows located in the damaged areas shown in Figure 6 were modeled as “failed” from the start of the simulation. A “failed” window opens the entire space within the window frame thereby allowing airflow across the entire area of the window.

2.4.2 Thermal Failure

Windows were programmed to “fail” based on the photographic evidence. Thermally induced stresses within the window panes were not predicted. In areas where there were extensive intervals between photographs (e.g., north façade) and extensive changes in the window status, the individual windows were programmed to break at intermediate times estimated via linear interpolation, as illustrated in Figure 9.

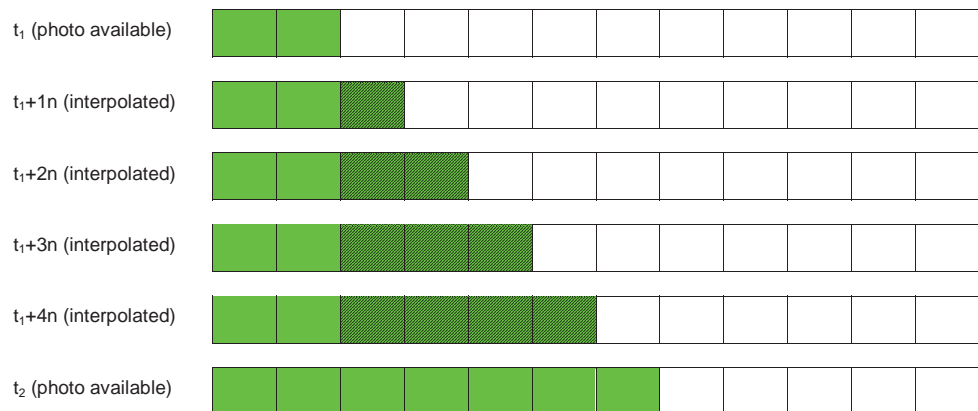


Figure 9 – Schematic representation of the interpolation of window failure times; for this example $n = (t_2 - t_1)/5$.

2.5 Description of Initiating Fire

For this study it has been assumed that the fire on the 12th floor initiated in the southwest corner around 10:30 a.m (corresponding to the collapse of WTC 1). The southwest corner was the area on the 12th floor most heavily damaged from the collapse of Tower 1.

The initiating fire was assumed to comprise four stages: incipient, growth, fully-developed, and decay. An incipient phase, in which the heat release rate was negligible was assumed lasting roughly 10 minutes. The incipient phase was incorporated to make a realistic assumption about the early development of the fire relative to the collapse of WTC 1. The incipient phase is not expected to have a significant effect on the conditions during the period of interest in the area of interest east of the building core. The growth phase consisted of a medium t-squared growth rate ($HRR = 0.01172 t^2$) until the fire reached a peak heat release rate of 4.9 MW. The initiating fire heat release rate was maintained at 4.9 MW for an hour, after which it decayed at a rate symmetrical to the growth rate. The heat release rate history of the initiating fire is shown in Figure 10.

The initiating fire was located within the room labeled as “copy room” measuring approximately 18 m². The peak heat release rate of the initiating fire was developed based on the room area and heat release rate density consistent with modular offices. The duration of the peak burning was extended to one-hour in order assure fire spread from the room/area of fire origin; the burning duration of the initiating fire is not expected to have a significant effect on conditions within the area of interest at later times.

The growth rate and the peak heat release were largely determined to be consistent with a modular office occupancy. For modular offices, a heat release rate density of 270 kW/m² [4] and a nominal medium t-squared fire growth have been observed in experiments [4]. The duration of burning at the peak heat release rate was extended to be consistent with the burning duration of two nominal office spaces. This was done to assure that the fire had spread sufficiently to adjacent spaces prior to removing the dedicated heat source. As the time period of principal interest begins more than three hours subsequent to the end of the initiating fire period as defined, any bias introduced by the assumed initiating fire should be minimal.

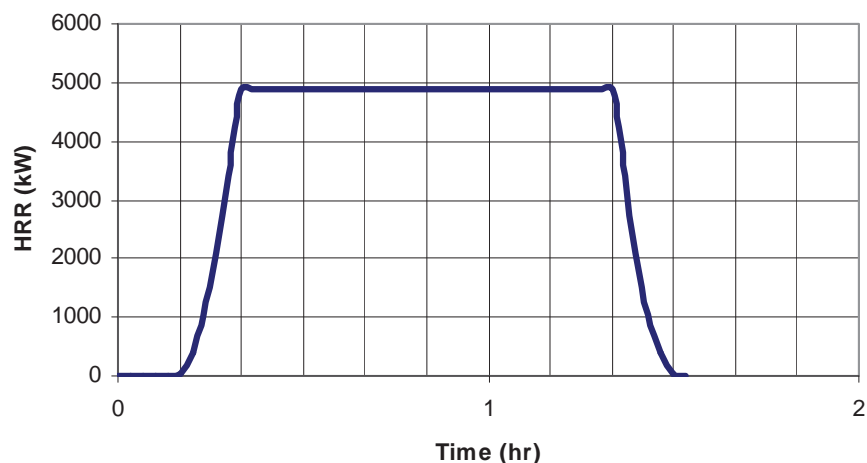


Figure 10 – Heat release rate history of the assumed initiating fire

2.6 Description of Fuels

2.6.1 Fuel “Targets”

The 12th floor in the WTC 7 building was a partitioned office area. Fuels in a typical office, such as desks, chairs, and papers, have been assumed to be largely comprised of natural materials (wood, paper, etc.). For the current modeling, the combustible contents of the office were agglomerated into rectangular “target” objects, rather than modeling each constituent object individually. The “targets” thus act as representative of the overall fuels present on the 12th floor.

The individual “target” is described as follows:

- Volume: 0.256 m³ (0.8 m x 0.8 m x 0.4 m high)
- Weight: 96.83 kg (~1452 MJ)
- Surface area exposed to ambient: 1.92 m²

2.6.2 Fuel Load

A fuel load of 7.5 lb/ft² (36.6 kg/m²) of floor area has been used. Based on the assumed fuel properties, this translates to a combustible load of 550 MJ/m² based on an assumed heat of combustion of 15,000 kJ/kg, which is representative of wood and paper as well as select synthetic/plastic materials [5]. The assumed combustible load is within the middle of the range of values of 300 to 800 MJ/m² cited in Buchanan [6] for offices. The combustible load range corresponds to equivalent fuel loads from ~4 lb/ft² (~20 kg/m²) to ~10 lb/ft² (50 kg/m²). The “target” fuels were distributed evenly throughout the usable area at floor level, except in the core of the building and in the interior stair located in the southwest corner.

2.6.3 Material Properties

The “targets” have been assigned properties equivalent to natural materials such as wood. The “average” material properties of oak and fir [7] were employed for the “targets” as summarized here. Experimental data indicates that ignition temperatures of wood range from 250 °C to 350 °C [8]. An ignition temperature of 300 °C was employed for the “targets” in this study.

Table 2 – Material Properties for “Target”

Properties	“target”
Conductivity [W/m/K]	0.138
Specific heat [kJ/kg/K]	2.56
Density [kg/m ³]	480
Heat of combustion [kJ/kg]	15,000
Heat of vaporization [kJ/kg]	2200

2.6.4 “Target” Burning Behavior

The “targets” were specified to follow a prescribed heat release rate history once the “target” surface temperature reached its threshold or ignition temperature. For modular offices, a heat release rate density of 270 kW/m² [4] and a medium t-squared fire growth have been observed in experiments [4]. The heat release rate upon ignition follows a medium t-squared fire growth curve and reaches a peak heat release rate calculated

based on the desired overall heat release rate density for the office floor. The heat release rate history for an individual “target” is shown in Figure 11. The burning duration of each individual target is a function of the specified heat release rate per unit area and the specified fuel load. On average, the burning duration within modular type offices is expected to be on the order of 30 to 40 minutes. The assumed fuel load and burning parameters (550 MJ/m² and 270 kW/m², respectively) are consistent with these expectations.

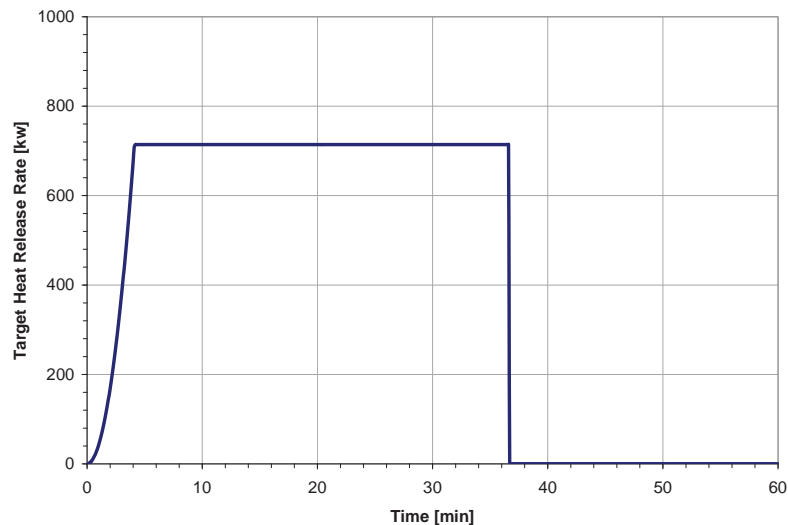


Figure 11 – Idealized heat release rate history of individual “target”

2.7 Ceiling Tile Failure

The assumed principle mode for fire spread across the 12th floor is via the passage of hot (combustion) gases from one office to the next. The office construction consisted of non-rated gypsum wall partitions. It is believed that the partitions did not extend to the underside of the slab of the floor above. Instead, a suspended ceiling was installed concealing the void above. It is likely that fire spread from room to room is facilitated by the open ceiling void. The heat from the fire in the room of origin would cause the suspended ceiling support structure to warp and fail. The heat would then pass into the void above, resulting in the heating and subsequent failure of the suspended ceiling structure above the adjacent rooms. This heating leads to the ignition of combustibles in the adjacent spaces.

Within the model, the suspended ceiling was comprised of a cluster of approximately 3.3 ft x 3.3 ft ceiling tiles that were modeled to “fail” once either surface facing a floor below or facing a slab above reached 400 °C. Upon reaching the threshold temperature, the tile object is removed from the model. Fixed temperature “heat detectors” were placed above and below each ceiling tile to approximate the temperature response of the tiles to heat exposure. The material properties of the ceiling tile were identical to those used in the modeling of WTC 1 and WTC 2 completed by NIST [9]. A description of the properties is included in Section 2.8.

2.8 Material Properties

The material properties for all materials used in the modeling other than the “targets” are presented in this section. The floor slabs were constructed of concrete flooring with a carpet. Gypsum board constituted the interior partition walls; the façade consisted of brick. The material properties employed have been tabulated in Table 3. It is noted that the carpet and gypsum wallboard were not modeled as combustible and therefore did not contribute to the combustible load. The fuel load, consistent with the 270 kW/m² cited for modular offices was comprised of the fuel “targets”, evenly distributed across the floor..

Table 3 – Material properties used in CFD models

Material	Specific heat [kJ/kg/K]	Conductivity [W/m/K]	Density [kg/m ³]	Thickness [m]
Concrete	0.88 [10]	1.000 [10]	2000 [10]	0.140
Carpet [11]	9.00	0.160	750	0.006
Gypsum board	0.84 [10]	0.480 [10]	1440 [10]	0.013
Brick	0.84 [12]	1.000 [12]	2000 [12]	0.100
Ceiling tile [9][13]	0.51	0.061	463	0.015

2.9 Wind Conditions

Wind conditions were considered because of their effects on flows into and out of the building. Wind speed and direction measured in New York City (NYC) were input in the models as presented in Table 4 [14]. The wind was modeled to blow from true north (0°/360°) as it was deemed to be representative of the prevailing direction of wind during the day of the incident. The wind speed was varied in a linear fashion from one measured time to another. The wind speed and direction from September 11, 2001 in NYC are presented in Appendix B.

Table 4 – Wind Speed in NYC on September 11th, 2001 used in CFD model [14]

Date	Time	Wind Speed [kt]
September 11, 2001	10:51 a.m.	5
	11:51 a.m.	4
	12:51 p.m.	5
	01:51 p.m.	8
	02:51 p.m.	6
	03:51 p.m.	3
	04:51 p.m.	5
	05:51 p.m.	4

2.10 Limitations and Assumptions

The assumptions and limitations, other than those mentioned above, include:

- The building core was not breached by debris and the self-closing doors provided in the core were closed throughout the simulation.
- No mechanical ventilation, including HVAC, was assumed to be operating;
- No vertical fire spread from the floor below was considered;
- The combustible materials, the interior walls, and the ceiling tiles were assumed to be undamaged by the debris from the collapse of WTC 1.

Limitations associated with modeling are discussed in brief in Appendix D.

3 Simulation Results

Multiple simulations were completed under a variety of assumptions and boundary conditions in order to develop a fire scenario that corresponds to the visual evidence of the event. A record of the simulations is included in Appendix A of this report. The progression of model permutations provided a qualitative understanding of the sensitivity of the predicted fire development and temperatures to a number of parameters including the initiating fire location and size, initial ventilation (e.g., broken windows) conditions, and prevailing wind conditions. The results presented in the following section are extracted from the simulation that is believed to best correspond to the photographic evidence, based on a coherent and justifiable set of assumed parameters, resulting in a reasonably representative scenario of the fires on the 12th Floor of WTC7 event on September 11, 2001.

The fire was initiated in the southwest corner of the building; the fire spread via the mechanisms described previously to the southeast corner of the building at around 2:00 p.m. The sequence of window failures, programmed based on the visual evidence collected from September 11, 2001, in essence pulls the fire around the floor plate. The fires progress or travel from the southeast corner of the building to the northwest corner between 2:08 p.m. and 5:00 p.m. The simulated results are consistent with the photographic evidence, with the exception of flame and smoke being evident on the west side of the building in the CFD results; there is no corroborating visual evidence of smoke or flame on the west side of the building on Floor 12. This discrepancy may be due to:

- In the model, excessively high fuel loads may have placed on the west side of the building; most of this area was not individual offices but rather reading or conference rooms.
- Vent openings in the west façade may be over-represented.
- Combustible items that existed on the southwest corner may have been damaged by the debris from the collapse of WTC 1; this area may have then acted as a fire break limiting flame spread beyond this point.
- In the model, the venting of the southwest corner may be underrepresented. Only the window area has been removed from the model whereas the debris damage from the collapse of World Trade Center 1 was more extensive in reality than the windows.

3.1 Comparison with Photographic Evidence (External Flaming)

The FDS results along the east and north facades are compared here with the photographic evidence in Figure 12 through Figure 18. The model results with respect to the flames are generally consistent with the available visual observations from the period from 2:00 p.m. to 5:00 p.m. The progression of the fire prior to 2:00 p.m. is consistent with the first recorded evidence of fire in the southeast occurring at 2:08 p.m. One notable discrepancy around 5:00 p.m. is shown near the northwest corner where all fuels were consumed in the model whereas fire was spotted at the northwest corner in the photographic evidence. In the model the fuels around the north-west corner began to be pyrolyzed due to the fires on the west side, prior to the arrival of the fires traveling from east. As noted before, there was no photographic evidence showing flaming visible along the west façade.

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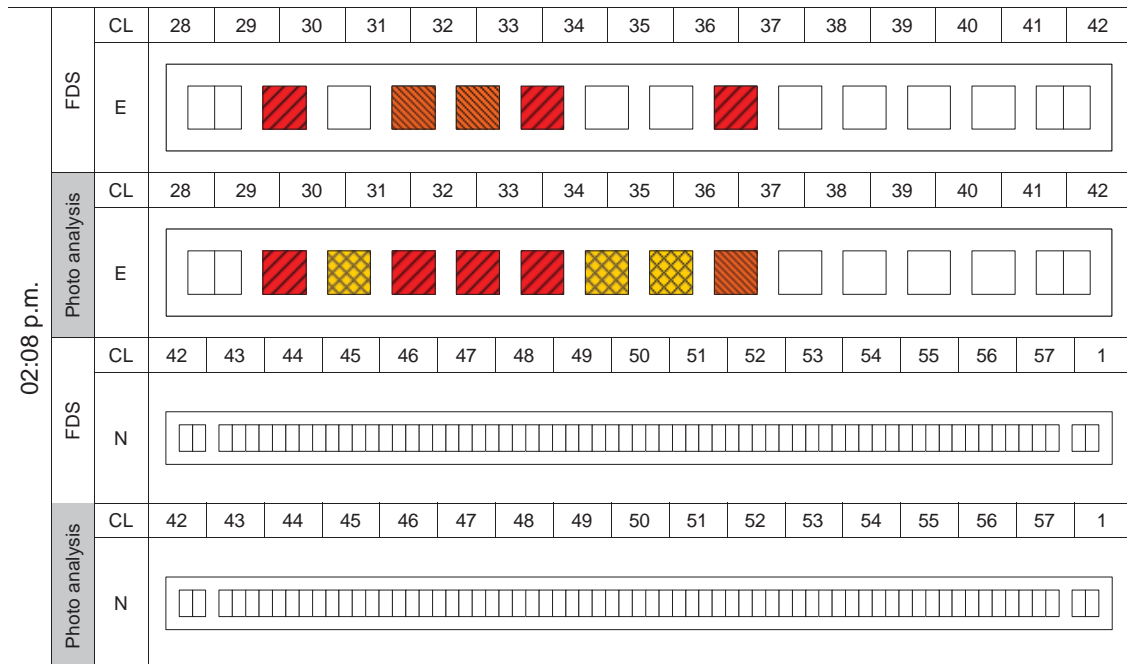
World Trade Center 7
Floor 12 Fire Effects Simulation

Figure 12 – Visual evidence along east and north façades at 02:08 p.m.

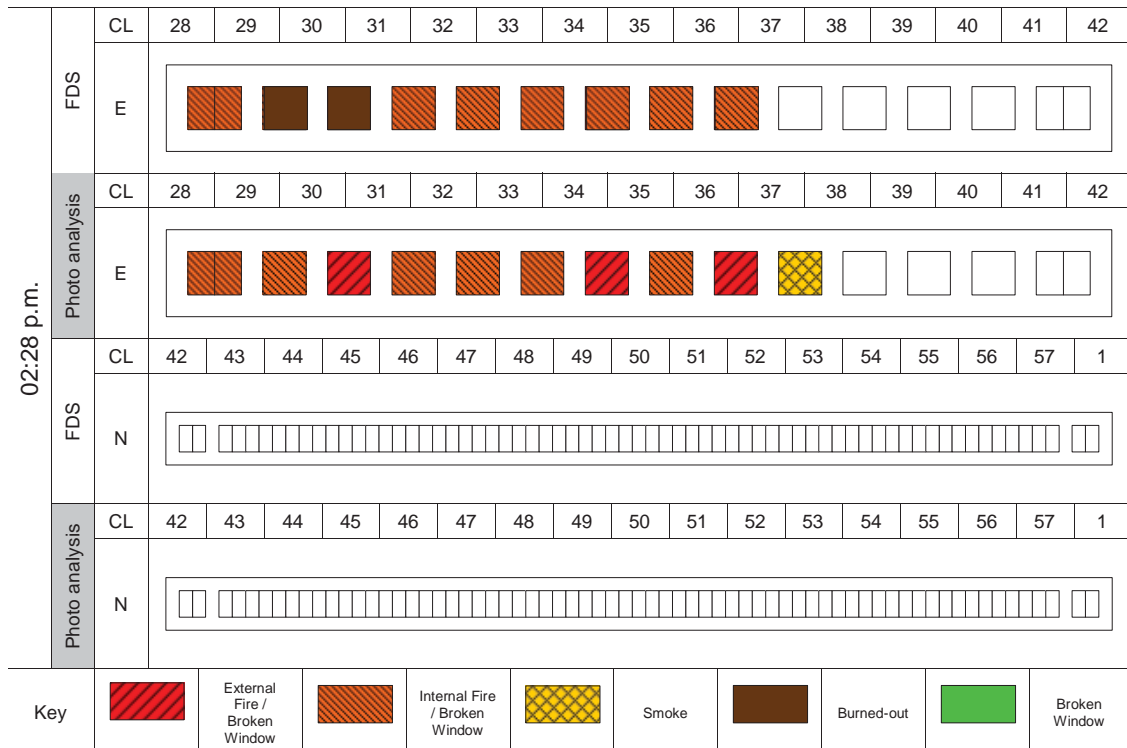


Figure 13 – Visual evidence along east and north façades at 02:28 p.m.

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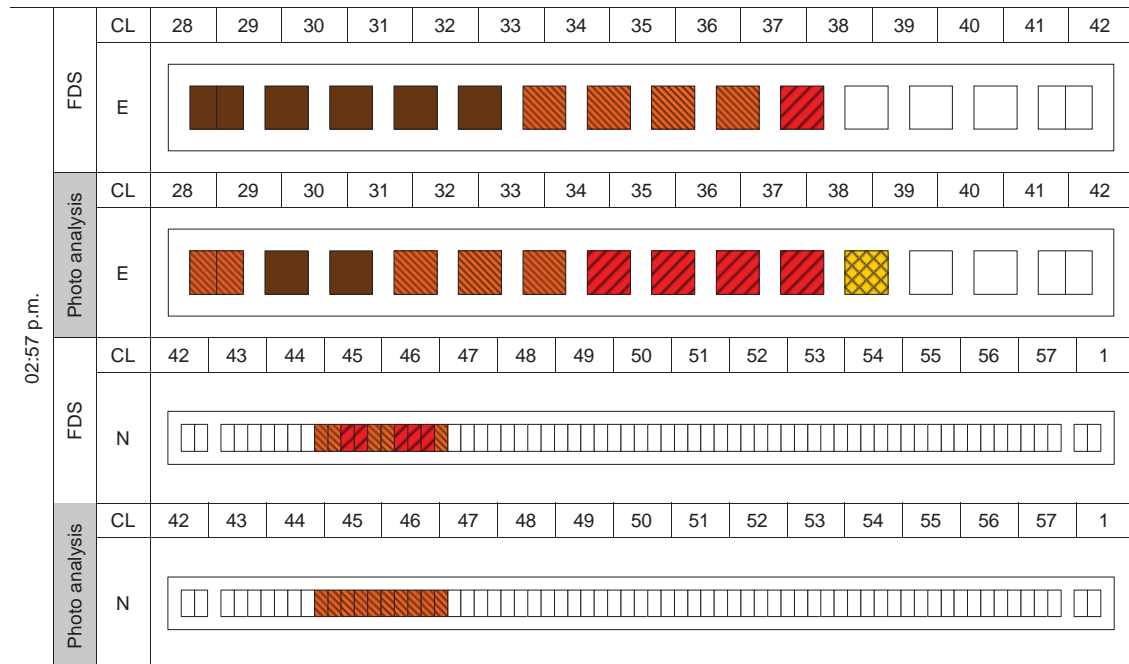
World Trade Center 7
Floor 12 Fire Effects Simulation

Figure 14 – Visual evidence along east and north façades at 02:57 p.m.

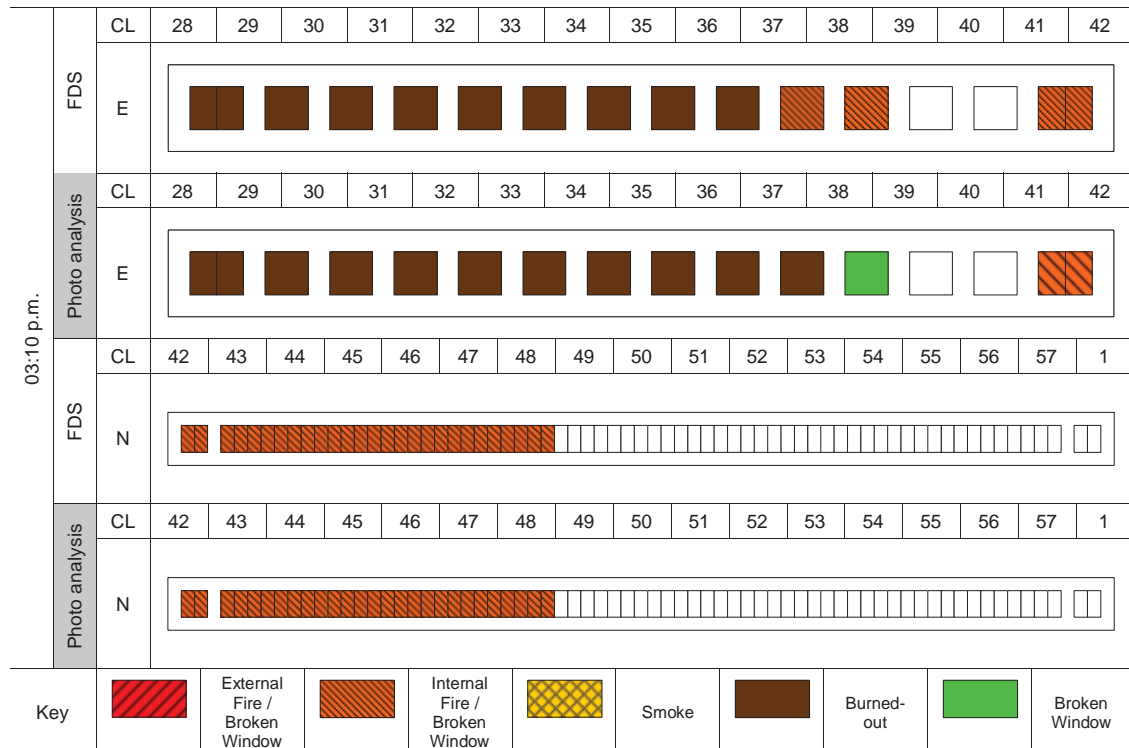


Figure 15 – Visual evidence along east and north façades at 03:10 p.m.

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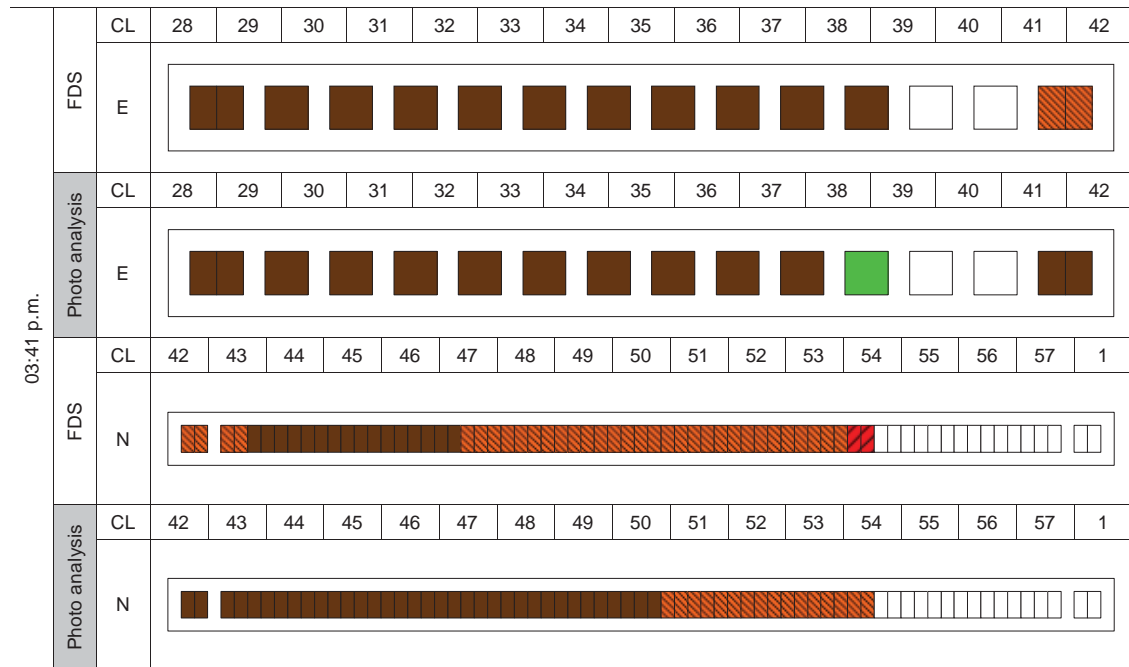
World Trade Center 7
Floor 12 Fire Effects Simulation

Figure 16 – Visual evidence along east and north façades at 03:41 p.m.

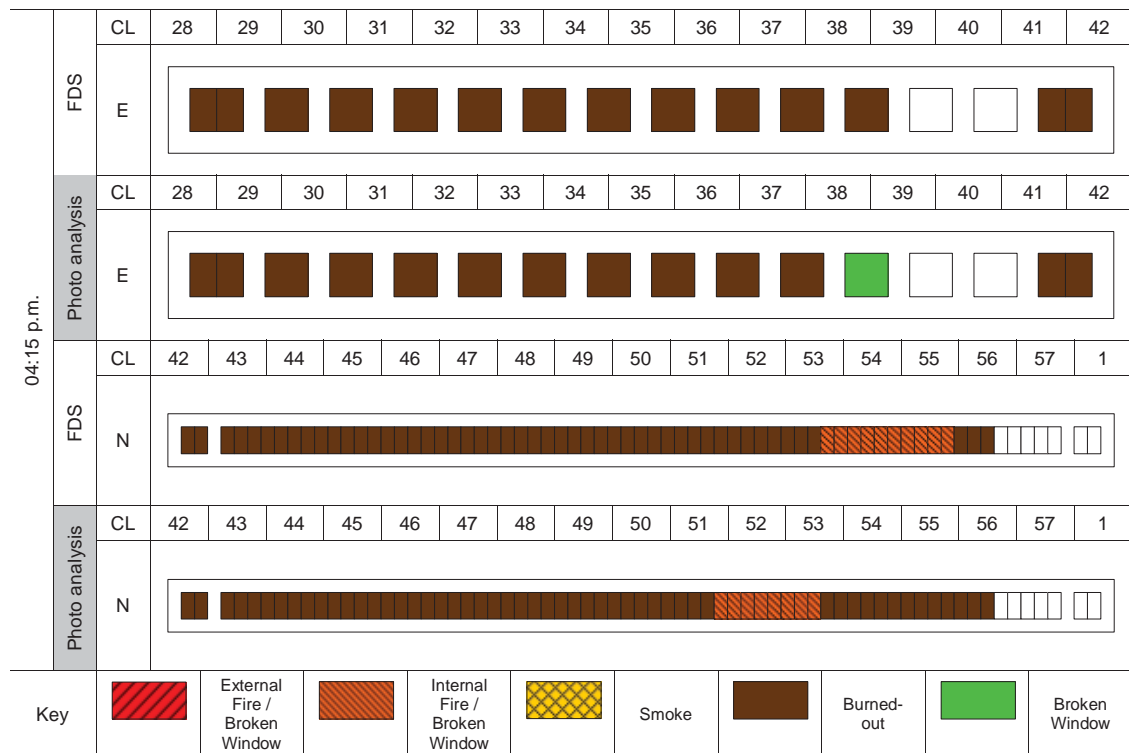


Figure 17 – Visual evidence along east and north façades at 04:15 p.m.

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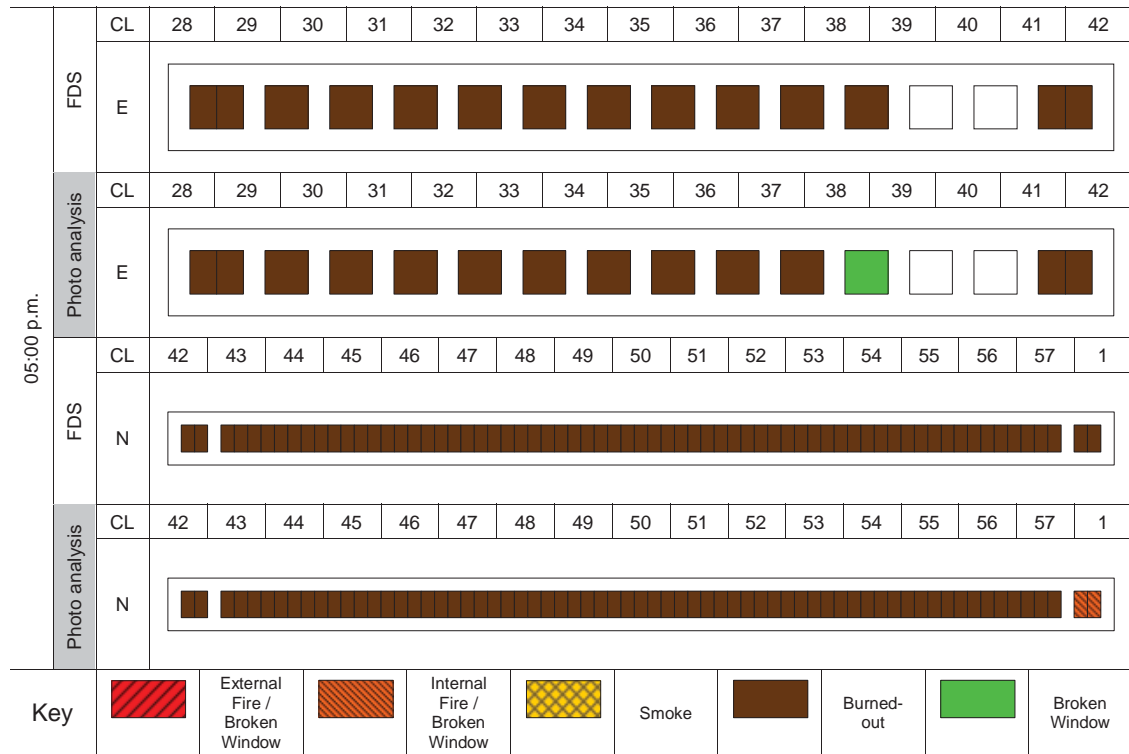
World Trade Center 7
Floor 12 Fire Effects Simulation

Figure 18 – Visual evidence along east and north façades at 05:00 p.m.

3.2 Gas Temperatures near Ceiling

Contours of gas temperatures near the elevation of the suspended ceiling are presented below at times corresponding to the available photographic evidence; results prior to the 2:08 p.m. simulated are not presented herein. This representation of the data provides an indication of the manner in which the fire was likely to have traversed the 12th Floor as well as the duration at which the structure in certain areas of the building were exposed to elevated temperatures.

The FDS predictions indicate that a fire starting from the southwest corner reached the southeast area of the building around 2:00 p.m. Subsequently, the fires traveled counterclockwise from the southeast corner to the northwest, which is consistent with the visual observations. Gas temperatures of more than 1000 °C were shown in localized areas where the fire would be considered fully-developed.

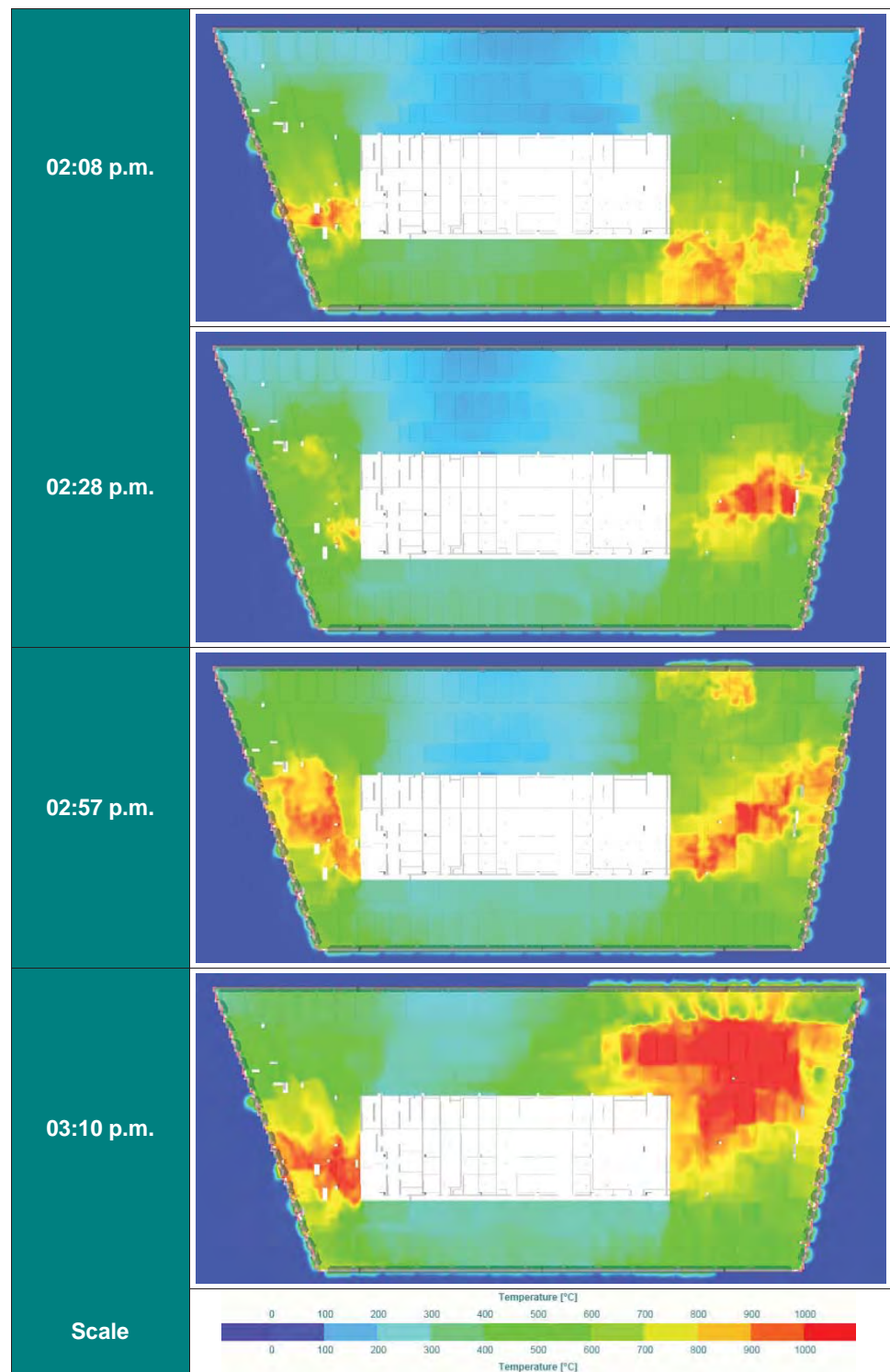


Figure 19 – Temperature contour near ceiling from 2:08 p.m. to 3:10 p.m.(2.6 m above Floor)

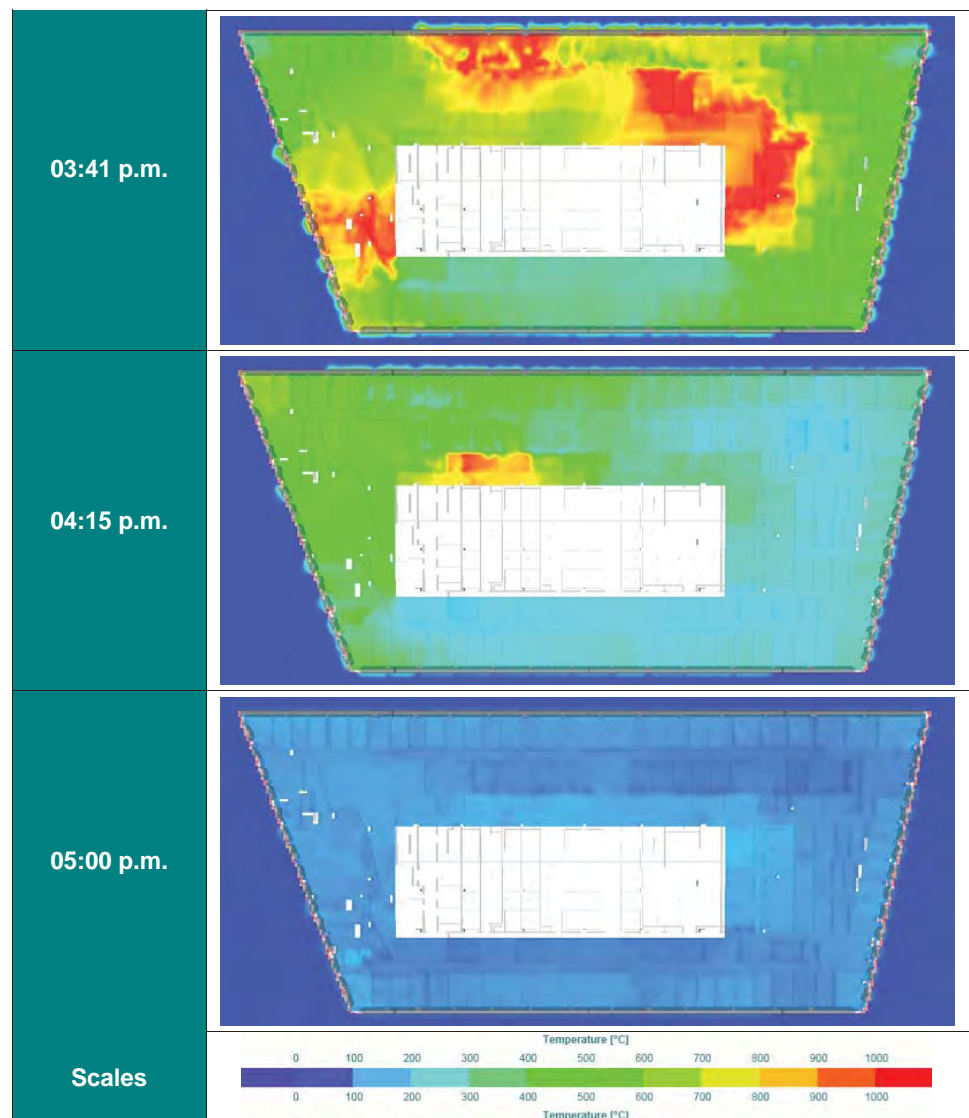


Figure 20 – Temperature contour near ceiling from 3:41 p.m. to 5:00 p.m. (2.6 m above floor)

3.3 Temperature Averages

Monitoring points were placed throughout the computational domain in order to record temperatures and air velocities throughout the 12th floor. The monitoring points were evenly distributed in plan, on a 3.2 m x 3.2 m grid as shown in Figure 21. The monitors were placed at six (6) elevations throughout the floor area. The monitors were placed in horizontal planes such that the lowest level was located 0.4 meters above the floor and the uppermost level was 0.4 meters below the ceiling, as shown in Figure 22.

The principal area of interest in the structural investigation has been the area east of the building core; this area encompasses columns 79, 80 and 81. Temperature measurements within the area bounded, as shown in Figure 23, by the building exterior walls to the north, east and south, and on the west by columns 76, 77, and 78 have been

averaged to estimate the exposure conditions for the structure. The results presented here show the average of the measurements at each elevation as well as the overall spatial average (see Figure 24). More comprehensive results are provided in Appendix C.

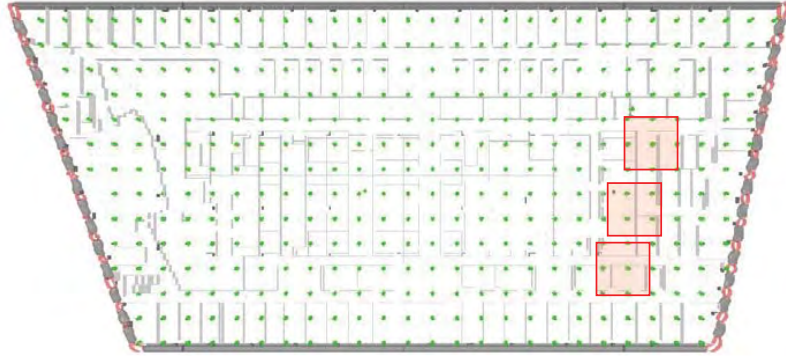


Figure 21 – Plan view showing the distribution of monitoring points (green dots) throughout the 12th Floor model domain – the regions around Columns 79, 80, and 81 have been highlighted in red

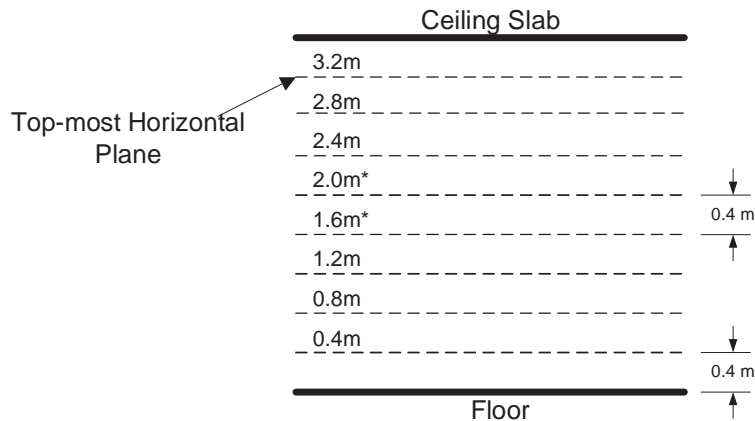


Figure 22 – Schematic section showing elevations where monitoring point locations

* Data at 1.6 m and 2.0 m have been interpolated from the measured data at the 1.2 and 2.4 m elevations

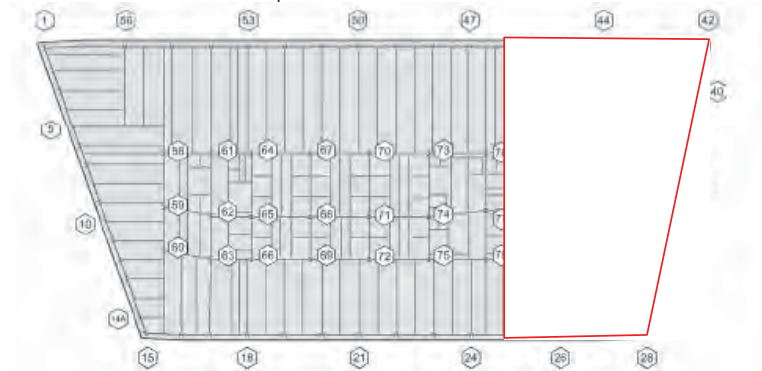


Figure 23 – Plan view identifying the area of interest east of the building core. Monitoring points within the shaded area have been averaged.

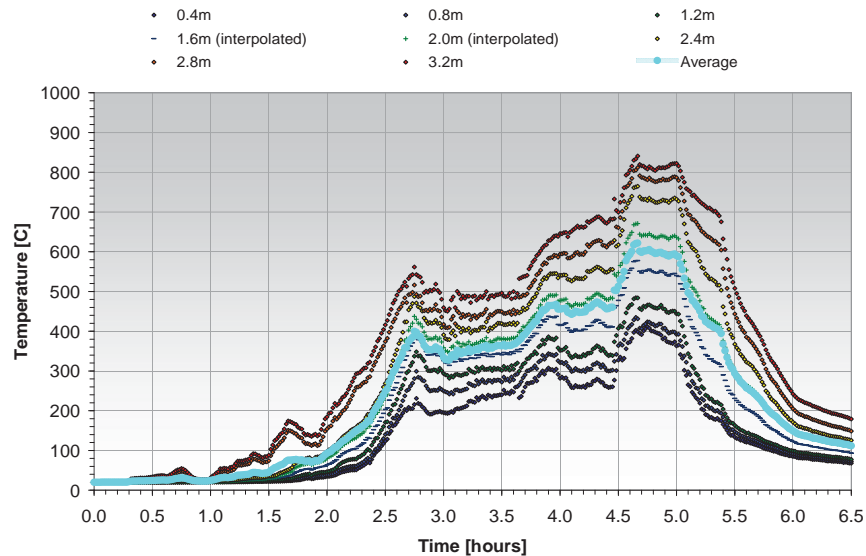


Figure 24 – Predicted average temperatures over the area east of the building core as a function of time for each of monitoring elevations. Time = 0 hours is approximately equivalent to 10:30 a.m.; time = 6.5 hours is roughly 5:00 p.m.

The results of the modeling indicate that there is a noticeable temperature gradient from floor to ceiling within the area of interest. When the temperatures have reached their maximum, the uppermost monitors are registering temperatures in excess of 800 °C while the lowest monitors register temperatures approximately 400 °C lower. As evidenced from Figure 24, the peak exposure persists for approximately ½ hour. The peak overall average temperature within the space east of the core is approximately 600 °C.

The spatially averaged time temperature profiles at each elevation were evaluated to determine the duration of exposure at certain temperature thresholds. The results are depicted in Figure 25; tabulated results can be found in Appendix C. The uppermost monitoring stations registered an average temperature in excess of 400 °C for approximately 3.25 hours; of that time temperatures were in excess of 600 °C for over 1.5 hours and over 800 °C for just under 0.5 hours.

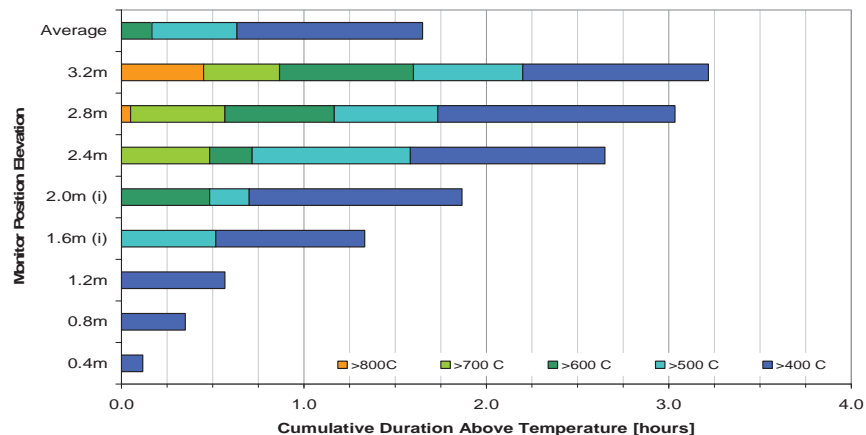


Figure 25 – Cumulative duration at or above designated temperature thresholds

The structural analysis focused on heating periods of approximately 1-hour; therefore, 1-hour rolling averages have been taken of the temperatures measured at each monitor elevation. The maximum 1-hour average for the entire volume is 537 °C; the maximum 1-hour average exposure for the temperature monitoring station nearest the ceiling has been found to be in excess of 750 °C.

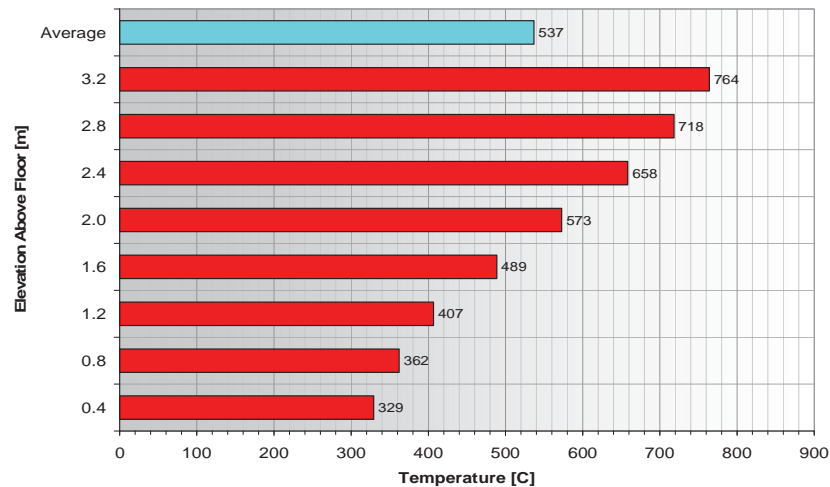


Figure 26 – Peak 1-hour rolling average at each monitoring elevation

3.4 Interpreted Exposure Conditions

The current section evaluates the CFD modeling results to derive an idealized representation of the temperatures to which the structure may have been exposed. The time temperature histories have been divided into one-hour segments.

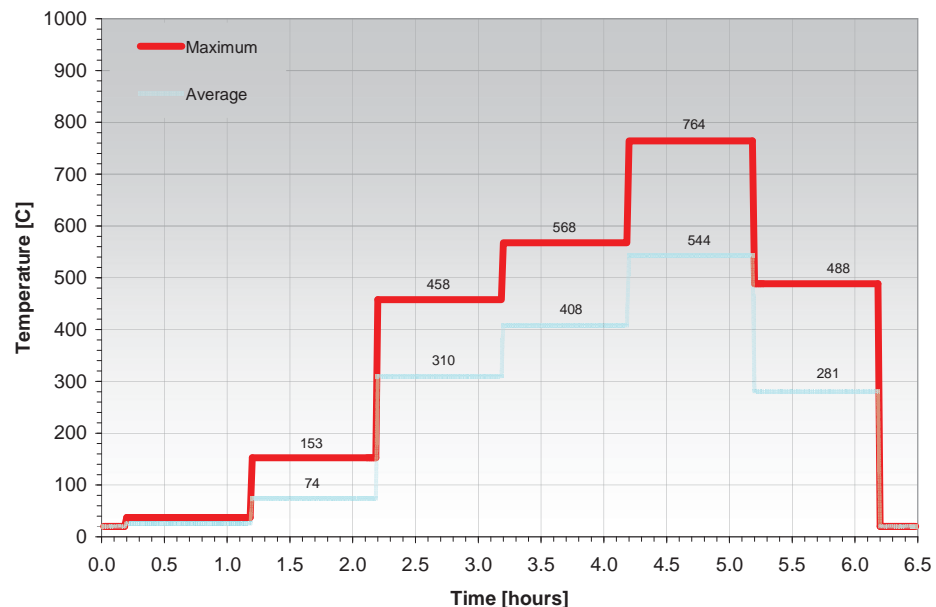


Figure 27 – Idealized 1-hour duration exposure conditions

4 Summary

The results of the CFD modeling are consistent with the photographic evidence along the east and north sides. Based on the visual evidence relating to the physical damage to the building resulting from the collapse of Tower 1 (e.g., broken windows, damaged façade, etc.) and an assumed initiating fire located in the southwest corner of the building, the fire was predicted to progress along the south side of the building from west to east approximately 10:30 a.m. until roughly 2:00 p.m. This corresponds with the visual photographic evidence in which windows in the southeast corner were observed to break and there was evidence of external and internal flaming along the east façade. From 2:08 p.m. onward, the progression of the fire correlated well to the visual evidence due in part to the adopted modeling methodology of programming the time to window failure to coincide with the photographic evidence.

There is relatively poor agreement with respect to conditions along the west façade. The photographic evidence shows limited if any smoke or flaming emanating from the west faced throughout the course of much of the day of September 11, 2001. The FDS modeling results indicate flaming and significant smoke emanating from the western portion of the building. Some of the discrepancy may be attributed to the combustion algorithms utilized within FDS, in particular the “mixed is burned” assumption, which can lead to the prediction of combustion in areas that may not in actuality have supported such combustion. The primary area of interest from this study has been the portion of the floor east of the building core. Therefore, unverified or unsubstantiated combustion along the west façade is not expected to have a significant effect on the thermal exposure to the structure on the east side of the building.

The objective of the CFD analysis was to develop a potential thermal exposure history to which portions of the structure may have been subjected on September 11, 2001. It is not suggested that the progression of the fire(s) on the day of the event occurred in precisely the manner as modeled. Rather, a fire scenario was developed based on reasonable assumptions with respect to fuel load and fuel properties in combinations with known or recorded data from the day of the event, such as wind speeds and visual or photographic evidence of window breakage. In referencing the photographic evidence, the visual progression of the fire as modeled appears to be consistent.

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World Trade Center 7
Floor 12 Fire Effects Simulation

Appendix A

Run Log

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A1 Run Log

Case	Simulation Time (hrs)	Initiating Fire			Wind	Note
		Location	Peak HRR (kW)	Duration		
WTC7w-02	5.5 (12:00 p.m. ~ 5:30 p.m.)	2 fires around south-east corner	4000	Persistent	OFF	
WTC7w-05	5.5 (12:00 p.m. ~ 5:30 p.m.)	2 fires around south-east corner	4000	Persistent	ON	
WTC7w-06	5.5 (12:00 p.m. ~ 5:30 p.m.)	2 fires around south-east corner	4000	Persistent	ON	Gash, Elevation change of suspended ceiling
WTC7w-07	7 (10:30 p.m. ~ 5:30 p.m.)	1 fire around south-west corner	4000	Persistent	ON	
WTC7w-08	5.5 (12:00 p.m. ~ 5:30 p.m.)	2 fires around south-east corner	4000	Persistent	OFF	Top and bottom open vents outside the building
WTC7w-09	7 (10:30 p.m. ~ 5:30 p.m.)	1 fire around south-west corner	4900	Persistent	ON	
WTC7w-10	7 (10:30 p.m. ~ 5:30 p.m.)	1 fire around south-west corner	4900	1.5 hrs	ON	
WTC7w-11	7 (10:30 p.m. ~ 5:30 p.m.)	1 fire around south-west corner	4900	1.5 hrs	ON	Incipient, growth, fully developed, and decay phase for initiating fire

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Floor 12 Fire Effects Simulation

Appendix B

Wind Conditions

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B1 Wind Conditions

Table A1 – Wind speed and direction in NYC on September 11, 2001 [1]

Date	Time	Wind Speed [kt]	Wind Direction [°]*
September 11, 2002	10:51 a.m.	5	360
	11:51 a.m.	4	VRB
	12:51 p.m.	5	320
	01:51 p.m.	8	040
	02:51 p.m.	6	020
	03:51 p.m.	3	VRB
	04:51 p.m.	5	360
	05:51 p.m.	4	360

* Clockwise from true north, VRB=variable

B2 References

- [1] Unedited Local Climatological Data Hourly Observations Table Central Park (NYC) (September 2001), U.S. Department of Commerce National Oceanic & Atmospheric Administration, Asheville, North Carolina.

<http://cdo.ncdc.noaa.gov/ulcd/ULCD>

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Floor 12 Fire Effects Simulation

Appendix C

**Temperature Data East
of Building Core**

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C1 Spatially Averaged Temperatures

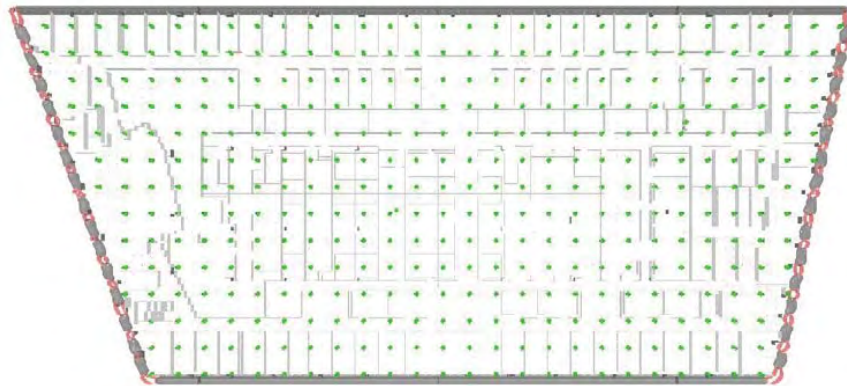


Figure C1 – Plan view showing the distribution of monitoring points (green dots) throughout the 12th Floor model domain

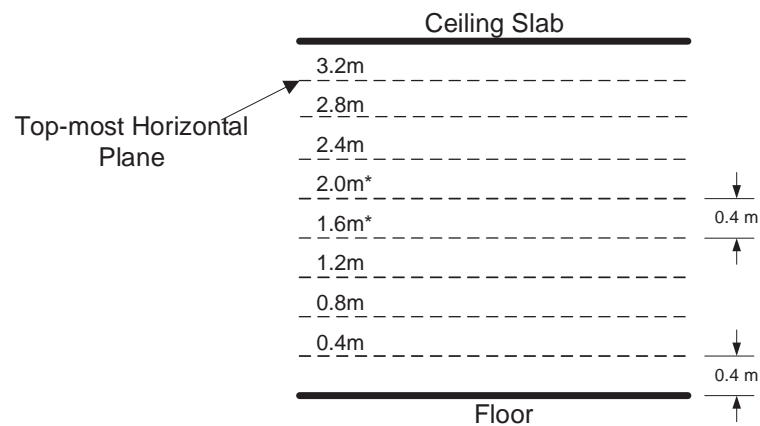


Figure C2 – Schematic section showing elevations where monitoring point locations

* Data at 1.6 m and 2.0 m have been interpolated from the measured data at the 1.2 and 2.4 m elevations

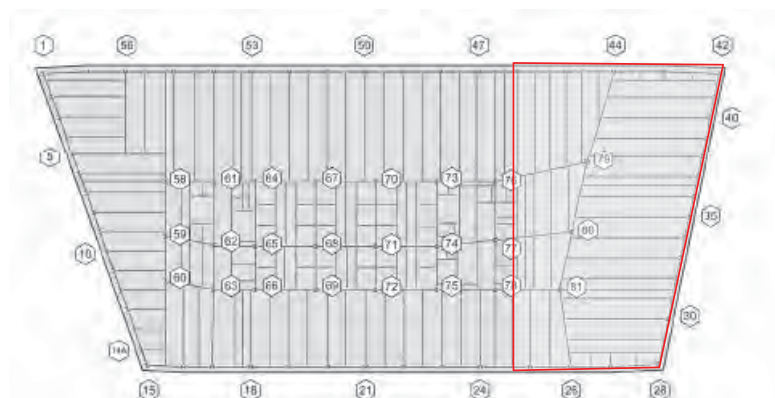


Figure C3 – Plan view identifying the area of interest east of the building core. Monitoring points within the shaded area have been averaged to yield the following.

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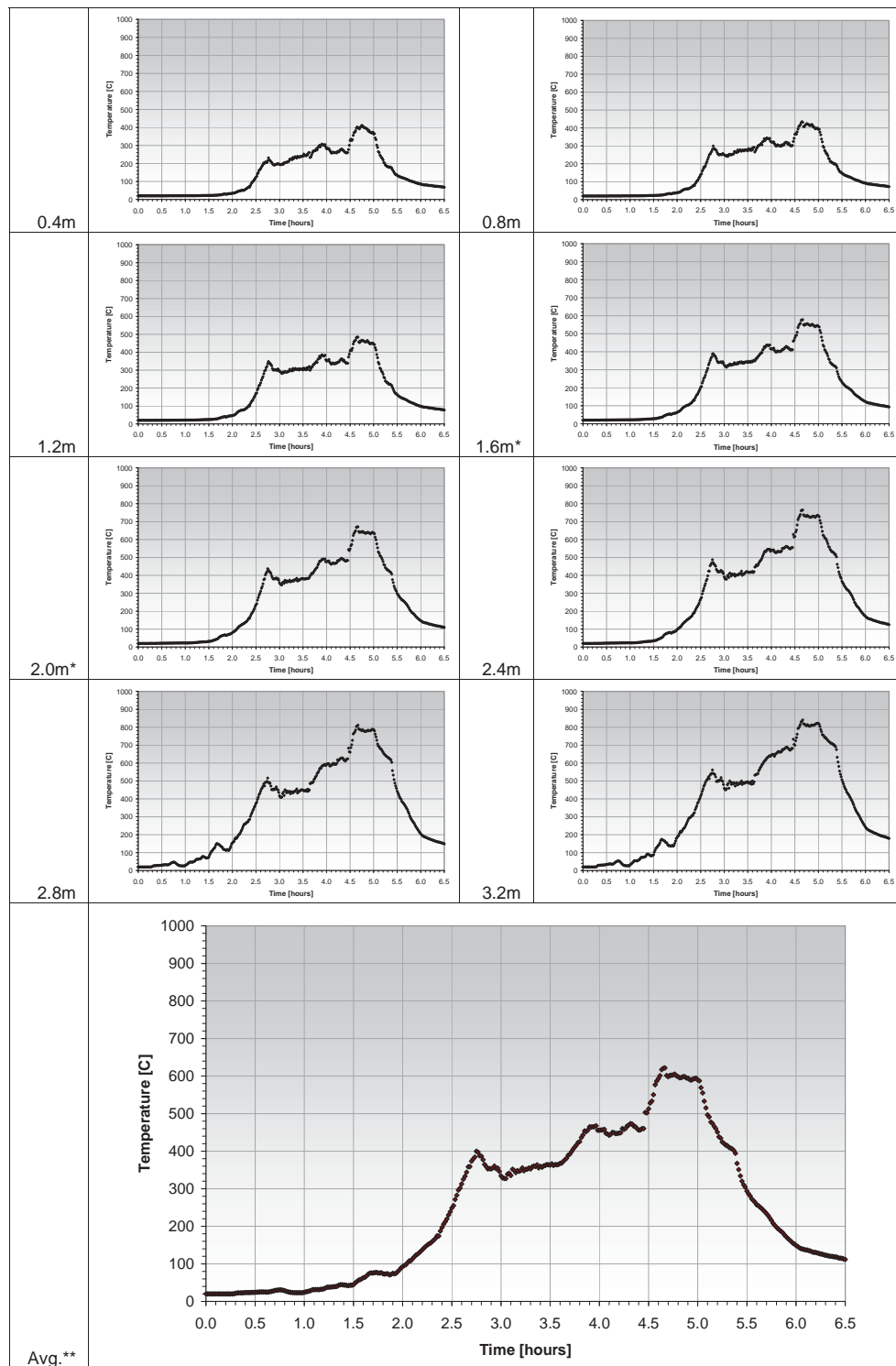
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Figure C4 – Time temperature curves for average of each of the monitoring position elevations east of the building core

* Data at 1.6 m and 2.0 m have been interpolated from the measured data at the 1.2 and 2.4 m elevations

** The average accounts for only the measured data; the interpolated results at 1.6m and 2.0m have been excluded from the (vertical) spatial averaging.

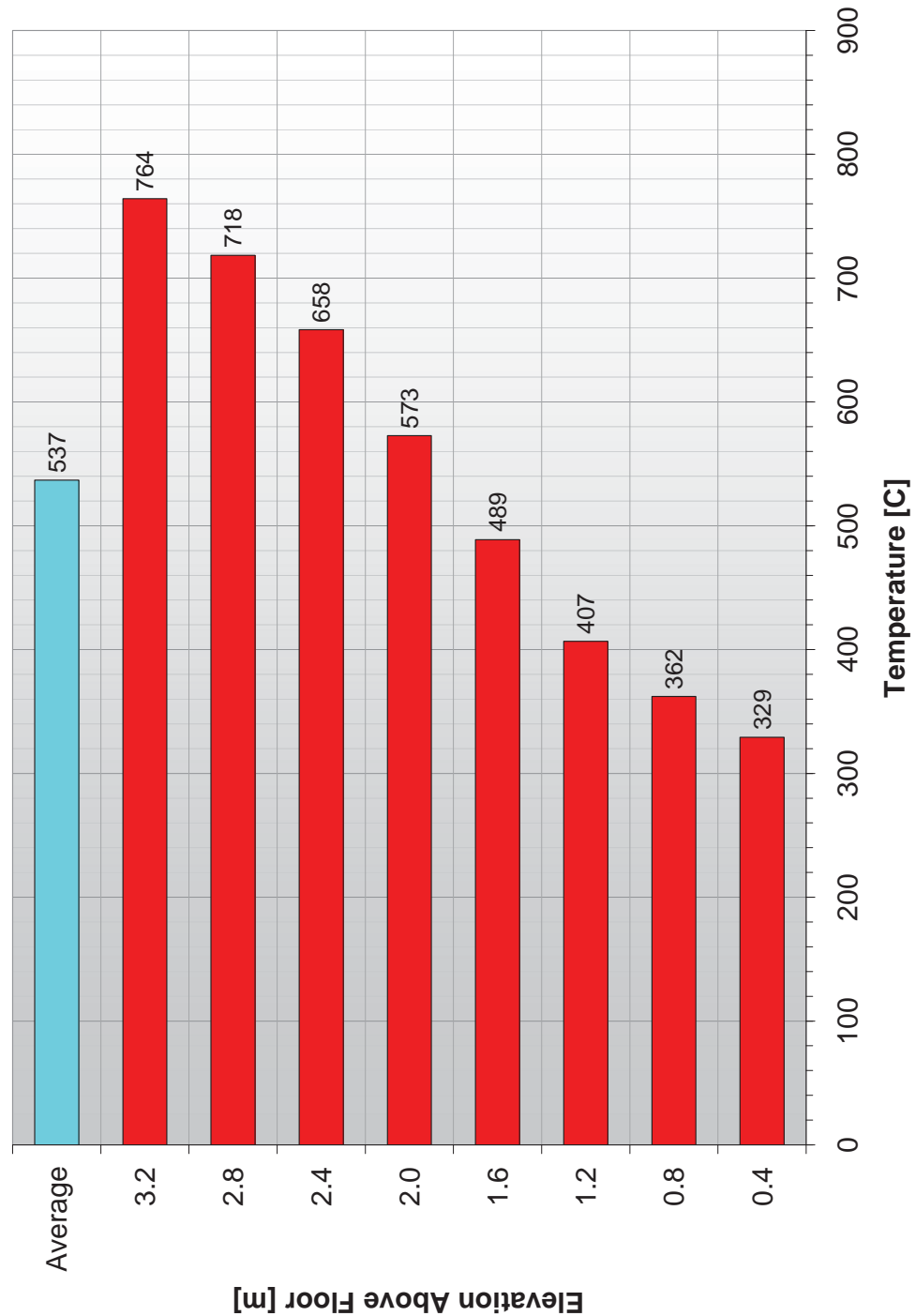


Figure C5 – Peak 1-hour rolling average at each monitoring elevation

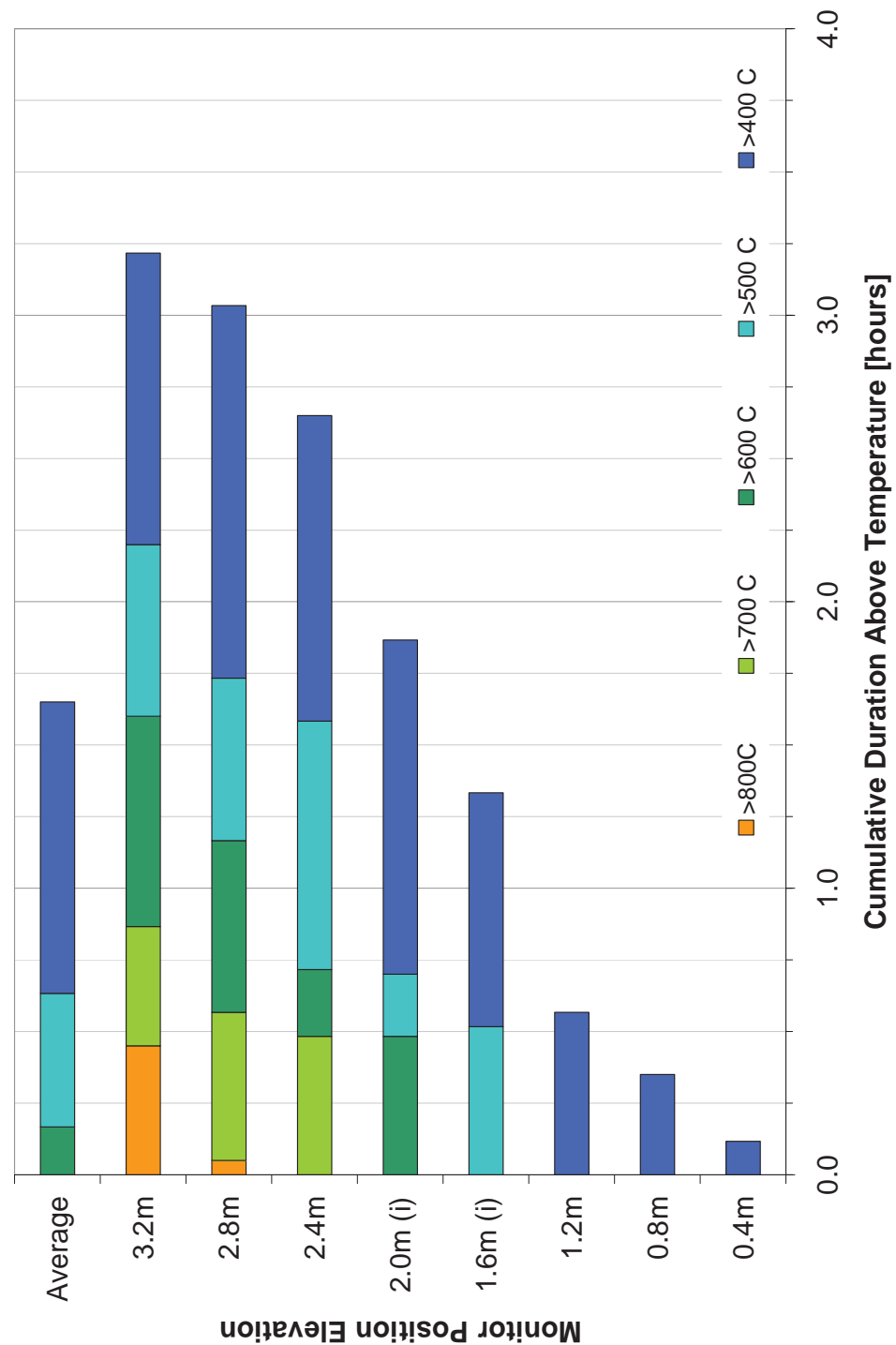


Figure C6 – Cumulative duration above designated temperature thresholds

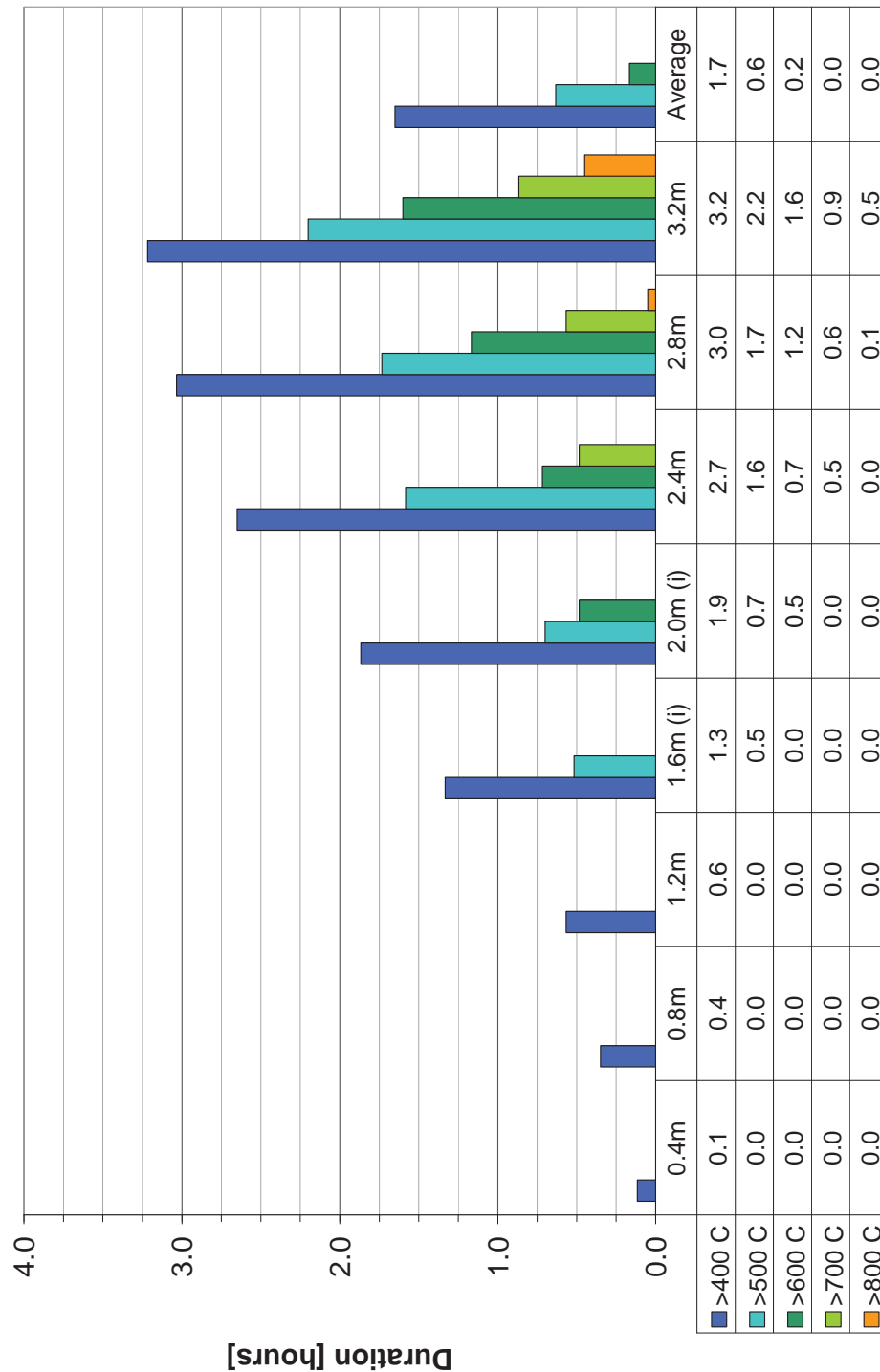


Figure C7 – Duration at or above each designated temperature threshold

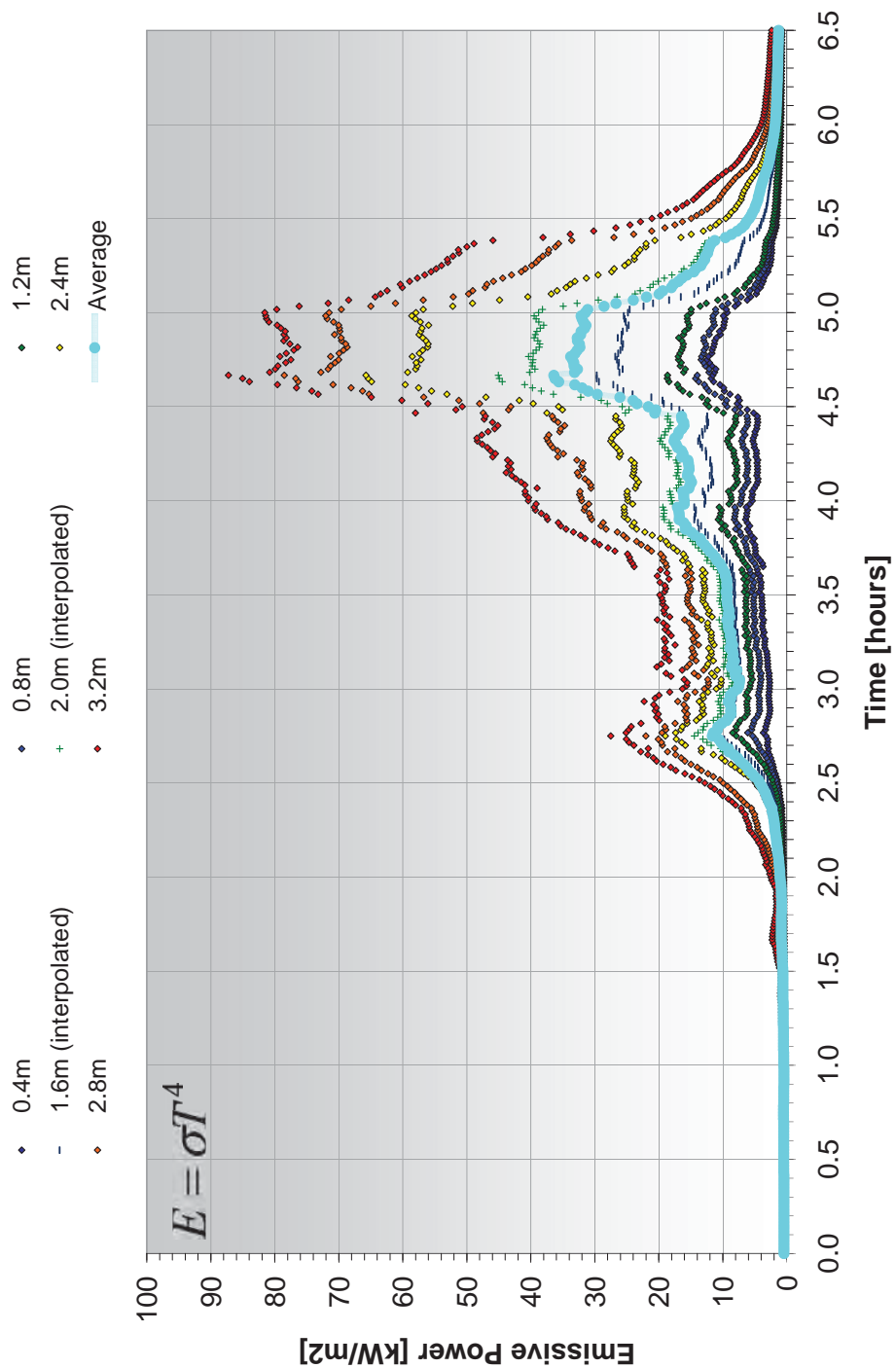


Figure C7 – Equivalent emissive power to measured gas temperature, scaled according to the expression $E = \sigma T^4$.

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Appendix D

**Fire Dynamics
Simulator (FDS)**

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D1 Overview

Fire Dynamics Simulator (FDS) versions 5.3.1 [1] has been used to reconstruct the fires on Floor 12 in WTC 7 and to evaluate the fire conditions within the building. Since the first version of FDS released in 2000 by the National Institute Standards and Technology (NIST), it has been widely used and validated rigorously by the fire protection engineering community. Solving the form of Navier-Stokes equations appropriate for low mach number flows, FDS is specifically developed for simulating the gas phase fire environment of scenarios by giving emphasis on heat and smoke flows from fires.

D1.1 Model Uses

FDS has been validated and used in the following areas [3]:

- Fire plumes
- Pool fires
- Growing fires
- Flame spread
- Compartment fires
- Sprinklers, mist systems, and suppression by water
- Airflows in fire compartments
- Tunnel fires
- Smoke detection
- Combustion modeling
- Air and gas movement in the absence of fire
- Wind engineering

D1.2 Model Outputs

Typical outputs for the gas phase include:

- Gas temperature
- Gas velocity
- Gas species concentration (CO₂, CO, N₂, etc)
- Smoke concentration and visibility estimates
- Pressure
- Heat release rate per unit volume
- Mixture fraction (or air/fuel ratio)
- Water droplet mass per unit volume

On solid surfaces, FDS predicts additional outputs associated with the energy balance between gas and solid phase, including:

- Surface and interior temperature
- Heat flux, both radiative and convective
- Burning rate
- Water droplet mass per unit area

Global quantities recorded by the program include:

- Total Heat Release Rate (HRR)

- Sprinkler and detector activation times
- Mass and energy fluxes through openings or solids

D1.3 Model Output Visualization

The three dimensional computation domain and the results computed by FDS can be viewed by a scientific visualization program, Smokeview, developed by NIST [3]. The following results can be displayed by Smokeview:

- “Flame” sheet;
- Movement of air and smoke;
- 2D shaded contours and vectors of gas phase results such as temperature, velocity, gas concentration, and heat release rate;
- 2D shaded contours and vectors of solid phase results such as wall surface temperature and heat fluxes;
- 3D iso-surfaces of gas phase quantities;
- Activation of sprinkler, heat detectors, and smoke detectors
- Others.

D2 Governing Equations

D2.1 Governing Equations

D2.1.1 Hydrodynamic Model

Conservation of mass, conservation of momentum, the divergence of velocity (conservation of energy), the ideal gas law, and conservation of mixture fraction are used in FDS [1].

D2.1.2 Turbulence Model

There are two options to solve for the viscosity: Large Eddy Simulation (LES) and Direct Numerical Simulation (DNS) [1]. For most large domain applications, a DNS is not currently practical to apply due to the high computational cost. In LES, large eddies are directly computed using Navier-Stokes equations while small eddies are modeled. FDS uses the Smagorinsky sub grid scale (SGS) model to represent small eddy motion.

D2.1.3 Combustion Model

Two combustion models are embedded in FDS: finite-rate reaction and mixture fraction combustion. If a DNS calculation is invoked, it is appropriate to employ finite-rate reaction. Otherwise, a mixture fraction combustion model is appropriate to apply.

If the chemical reaction is assumed to be infinitely fast, all the parameters related to finite-rate chemical kinetics can be eliminated. From this assumption, "mixture fraction" representing the fraction of material at a certain point and time originated in the fuel stream is introduced. This "conserved scalar" parameter, mixture fraction, is able to reduce the computation time significantly.

The mass fractions for each species can be expressed with regards to the mixture fraction. These correlations are called "state relations". A mixture fraction (Z) of 1 indicates the pure fuel while ambient air is represented by 0. Once appropriate amount of oxygen and fuel exist in one cell, a flame is formed and combustion occurs.

D2.1.4 Thermal Radiation Model

Where i , S , a , and subscript b denote the radiation intensity, coordinate along the path of radiation, the absorption coefficient, and blackbody radiant intensity, respectively.

The source term is given by blackbody radiation intensity:

$$i'_b = \frac{\sigma}{\pi} T^4 \quad [C1]$$

where σ is the Stefan-Boltzman constant. The use of mean absorption coefficient a results in reducing the amount of computation considerably since the values of a can be tabulated as a function of variables such as gas temperature and mixture fraction by assuming that all species, including soot, are unique functions of mixture fraction. a is pre-calculated in FDS by employing RADCAL [2].

D3 Model Uncertainty

The use of a computational tool such as FDS can provide valuable understanding regarding possible fire development and the resulting conditions. However, the model is only a simulation of the possible course of events, the outcome of which is dependent upon the input selected for the model. Complete knowledge of the fire site is not possible; therefore assumptions or estimates are made in developing the model and model scenario.

FDS's ability to accurately predict temperatures and velocities of fire gases has been previously evaluated by way of validation exercised involving both small-scale and large-scale experiments. For relatively simple fire driven flows, such as buoyant plumes and flows through doorways, FDS predictions have been found to be within the experimental uncertainty of the measured values [5]. In large scale fire tests reported in [5], FDS temperature predictions were found to be within 15 % of the measured temperatures and the FDS heat release rates were predicted to within 20 % of the measured values.

D4 Limitations

The following sections are excerpted from the FDS Technical Reference Guide [1] and are intended to provide an overview of the limitations of FDS as they may pertain to this study:

D4.1 Low Speed Flow Assumption

The use of FDS is limited to low-speed (mach numbers less than about 0.3) flow with an emphasis on smoke and heat transport from fires. This assumption rules out using the model for any scenario involving flow speeds approaching the speed of sound, such as explosions, choke flow at nozzles, and detonations.

D4.2 Rectilinear Geometry

The efficiency of FDS is due to the simplicity of its rectilinear numerical grid and the use of a fast, direct solver for the pressure field. This can be a limitation in some situations where certain geometric features do not conform to the rectangular grid, although most building components do. There are techniques in FDS to lessen the effect of "sawtooth" obstructions used to represent nonrectangular objects, but these cannot be expected to produce good results if, for example, the intent of the calculation is to study boundary layer effects. For most practical large-scale simulations, the increased grid resolution afforded by the fast pressure solver offsets approximations of curved boundaries by small rectangular grid cells.

D4.3 Fire Growth and Spread

Because the model was originally designed to analyze industrial-scale fires, it can be used reliably when the heat release rate (HRR) of the fire is specified and the transport of heat and exhaust products is the principal aim of the simulation. In these cases, the model predicts flow velocities and temperatures to an accuracy within 10 % to 20 % of experimental measurements, depending on the resolution of the numerical grid. However, for fire scenarios where the heat release rate is predicted rather than specified, the uncertainty of the model is higher. There are several reasons for this: (1) properties of real materials and real fuels are often unknown or difficult to obtain, (2) the physical processes of combustion, radiation and solid phase heat transfer are more complicated than their mathematical representations in FDS, (3) the results of calculations are sensitive to both the numerical and physical parameters.

D4.4 Combustion

For most applications, FDS uses a mixture fraction-based combustion model. The mixture fraction is a conserved scalar quantity that is defined as the fraction of gas at a given point in the flow field that originated as fuel. In its simplest form, the model assumes that combustion is mixing controlled, and that the reaction of fuel and oxygen is infinitely fast, regardless of the temperature. For large-scale, well-ventilated fires, this is a good assumption. However, if a fire is in an under-ventilated compartment, or if a suppression agent like water mist or CO₂ is introduced, fuel and oxygen are allowed to mix and not burn, according to a few empirically-based criteria. The physical mechanisms underlying these phenomena are complex, and are tied closely to the flame temperature and local strain rate, neither of which are readily-available in a large scale fire simulation. Subgrid-scale modeling of gas phase suppression and extinction is still an area of active research in the combustion community. Until reliable models can be developed for building-scale fire simulations, simple empirical rules can be used that prevent burning from taking place when the atmosphere immediately surrounding the fire cannot sustain the combustion.

D4.5 Radiation

Radiative heat transfer is included in the model via the solution of the radiation transport equation (RTE) for a gray gas, and in some limited cases using a wide band model. The RTE is solved using a technique similar to finite volume methods for convective transport, thus the name given to it is the Finite Volume Method (FVM). There are several limitations of the model. First, the absorption coefficient for the smoke-laden gas is a complex function of its composition and temperature. Because of the simplified combustion model, the chemical composition of the smokey gases, especially the soot content, can effect both the absorption and emission of thermal radiation. Second, the radiation transport is discretized via approximately 100 solid angles, although the user may choose to use more angles. For targets far away from a localized source of radiation, like a growing fire, the discretization can lead to a non-uniform distribution of the radiant energy. This error is called "ray effect" and can be seen in the visualization of surface temperatures, where "hot spots" show the effect of the finite number of solid angles. The problem can be lessened by the inclusion of more solid angles, but at a price of longer computing times. In most cases, the radiative flux to far-field targets is not as important as those in the near-field, where coverage by the default number of angles is much better.

D5 Validation

The following section summarizes a portion of the validation work that has been undertaken by NIST and the wider FDS user community. The majority of validation work to date has been to evaluate the model's ability to predict the transport of heat and exhaust products from a fire through an enclosure. Often, the heat release rate and production rates of various products of combustion have been prescribed. However, more recent validation efforts have considered fire growth, flame spread, suppression, sprinkler/detector activation, among other phenomena. The following is a listing of various fire-related (and other) phenomena for which validation exercises have been undertaken:

- Fire plumes
- Pool fires
- Fluid flow and gas dispersion in the absence of fire
- Wind engineering and external flows
- Growing fires
- Flame spread
- Compartment fires and compartment fire airflows
- Sprinklers, Mist System, and Suppression by Water
- Tunnel Fires
- Smoke Detection
- Combustion Model

Additional validation information may be found in the FDS Validation Guide [5].

D6 Reconstructions of Actual Fire Events

FDS has been applied in a number of instances for the “reconstruction” or reproduction of potential events from a fire event. Examples of this sort of application that have been cited in the FDS Validation Guide [7] include:

- Reconstruction of the Fires in the World Trade Center Towers [8]
- Structural Fire Response and Probable Collapse Sequence of World Trade Center Building 7 [9]
- The Station Nightclub Fire [10]
- Simulation of the Dynamics of the Fire at 3146 Cherry Road NE Washington DC, [11]
- Simulation of the Dynamics of a Fire in a One-Story Restaurant, Texas [12]
- Simulation of the Dynamics of a Fire in a Two-Story Duplex, Iowa [13]
- Cook County Administration Building Fire, Illinois [14]

Additional references for the use of FDS in investigating actual fires include Rein et al. [15], which looked at several fire events, and Spearpoint et al. [16]. The use of FDS as a forensic tool is discussed in [15].

D7 References

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Exhibit D Heat Transfer Analyses

Introduction

Heat transfer analyses were performed at the University of Edinburgh to calculate the temperature histories of structural steel members insulated with spray-applied fire resistive material (SFRM) in response to different exposure conditions. Calculations were performed for a range of different structural steel section sizes, insulation thicknesses, boundary conditions and exposure conditions. Calculations were also performed of concrete slab temperatures in response to different exposure conditions. The calculated steel and concrete temperature histories were then provided for input into the structural fire analyses performed by Arup. This document addresses the details and results of these heat transfer analyses.

Structural Steel Section Sizes

Table D-1 presents the different steel section sizes and associated dimensions and properties for the beams and girders included in the heat transfer analysis. The steel perimeter and W/D ratio presented in Table D-1 are based on 3-sided heating.

Heat transfer analyses were also performed for built-up girder and column sections. Dimensions and properties for these sections are shown in Table D-2. The steel perimeter and W/D ratio presented in Table D-2 are based on 4-sided heating.

Insulation thicknesses

A number of different insulation thicknesses were used in the heat transfer analyses to represent different levels of fire resistance based on UL listings and adjustment factors. Five different conditions were considered for beams, including:

- As-built – nominally ½ in. fireproofing thickness on all steel beams and girders;
- Class IB (2 hour) restrained – based on UL D739 listing with adjustment factors;
- Class IB (2 hour) unrestrained – based on UL D739 listing with adjustment factors;
- Class IC (1.5 hour) restrained – based on UL D739 listing with adjustment factors;
- Class IC (1.5 hour) unrestrained – based on UL D739 listing with adjustment factors;

The SFRM thickness required on steel beams for various unrestrained beam ratings and restrained assembly ratings under UL D739 are summarized in Table D-3, extracted from the current UL D739 listing. The Class IB (2 hour) restrained and Class IC (1.5 hour) restrained cases require the same SFRM thickness, so these five insulation thickness cases reduce to four calculated cases.

Table D-3 indicates that the as-built SFRM thickness of ½ in. would achieve a fire resistance rating of only 1 hour for an unrestrained beam. A SFRM thickness of ¾ in. is needed to achieve a fire resistance rating of 1-1/2 hour for an unrestrained beam with normal weight (NW) concrete; a SFRM thickness of 7/8 in. is needed to achieve a fire resistance rating of 2 hour for an unrestrained beam with normal weight concrete. In the mid-1980s, the UL D739 listing only included the first two rows of Table D-3; this listing did not include the entries for the 1-1/2 and 2 hour unrestrained beam ratings in that timeframe.

The Design Information Section in the current UL Fire Resistance Directory includes the formula shown below to adjust the SFRM thickness for beams with W/D ratios different from the W8x28 test beam, which has a W/D ratio of 0.82 based on 3-sided heating. This formula applies to W/D ratios of 0.37 or greater, but the minimum thickness of SFRM can be no less than 3/8 inch. This formula was used to adjust the required SFRM thicknesses used for the heat transfer analyses based on the W/D ratios of the different steel sections, except for the as-built case. In the as-built case, a SFRM thickness of ½ in. was used for all beam sizes.

$$T_1 = \frac{\left(\frac{W_2}{D_2} + 0.6\right)(T_2)}{\left(\frac{W_1}{D_1} + 0.6\right)} \quad (D-1)$$

T is the thickness (in.) of SFRM applied to the steel element, W is the weight of the beam (lb/ft) and D is the heated perimeter of the protection material, measured at the interface of the protection material and the steel through which heat is transferred to the steel (in.). Subscript 2 refers to the properties of the test beam; subscript 1 refers to the properties of the beam for which the SFRM thickness is being calculated.

Table D-4 presents the calculated SFRM thickness requirements for a number of different beam section sizes based on this adjustment factor. For sections with W/D ratios less than that of the test beam (W/D = 0.82 for the W8x28 test beam based on 3-sided contour protection), this formula results in a greater required thickness of SFRM; for sections with W/D ratios greater than that of the test beam, this formula results in a lesser required thickness of SFRM. It does not appear that these adjustments were made for the as-built condition.

Boundary Conditions

Four different boundary conditions were considered for the beam and girder heat transfer analyses, as illustrated schematically in Figure D-1. These boundary conditions were assigned to the following cases:

- Case A – element insulated on and heated on 4 sides;
- Case B – element insulated and heated on 3 sides with concrete slab in contact with 4th side;
- Case C – element insulated on 3 sides and heated on 4 sides;
- Case D – element insulated on 3 sides and heated on 4 sides with partial concrete slab contact on the 4th side.

Case A is representative of a column or truss element that is insulated on all four sides and exposed to fire conditions on all four sides. Case B is representative of a beam or girder element with complete contact between the top flange of the element and a concrete floor slab. Case C is representative of a beam or girder element with the top surface of the top flange fully exposed to fire exposure conditions. Case D is representative of a beam or girder element supporting a fluted deck with unfilled cavities; in this case, the contact area between the concrete slab and the top flange covers approximately 35% of the top flange and the unfilled cavity covers approximately 65% of the top flange of the steel element.

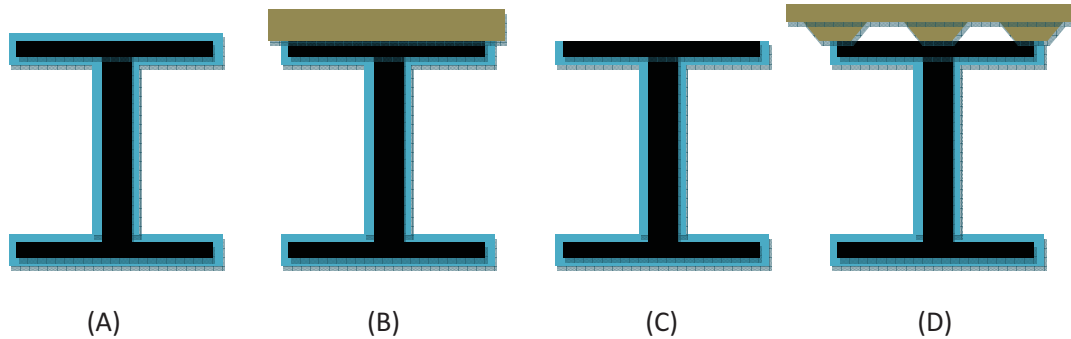


Figure D-1. Schematic diagram of boundary conditions used for heat transfer analyses.

Exposure Conditions

A range of exposure conditions were used to calculate the temperature histories of the different steel sections. These exposure conditions included steady gas temperatures of 400, 600, 700 and 800°C for a period of 1 hour, followed by an ambient gas temperature of 20°C for a period of 1 hour, as well as the standard time-temperature curve specified in the ASTM E119 standard for a period of 2 hours. The results from the 700 and 800°C cases were used in the structural fire analyses performed by Arup and discussed in the expert report of Prof. Colin Bailey.

Calculations

The calculations performed to generate the temperature histories for the steel elements, insulation conditions, boundary conditions and exposure conditions are described here. The material properties used for the analytical heat transfer calculations are shown in Table D-5. Temperature-dependent material properties used for the more detailed calculations described below were taken from the Model Code on Fire Engineering (ECCS-TC3) in the Eurocode. These properties are summarized in the Master Assumptions List prepared by Guy Nordenson and Associates.

The ABAQUS finite element analysis program was used to develop 2-dimensional heat transfer models for cases (A), (B) and (C) for each section. A 3-dimensional heat transfer model was developed in ABAQUS for case (D); this 3-D model covered approximately 40 contact areas to assure that the effects of the trapezoidal deck were accurately considered. These calculations demonstrated that heat distributes fairly evenly in the upper flange, with the main temperature gradient occurring vertically through the steel section. Consequently, three average temperatures are used to characterize the temperature of a section; the three temperatures are the top flange, the middle of the web and the bottom flange.

A one-dimensional lumped capacity analysis was also performed for Case (A); this lumped capacity analysis followed the step-by-step method outlined in Section 8.4.6 of Buchanan's book *Structural Design for Fire Safety*. The expression used for this lumped capacity analysis was of the form:

$$WC_s \frac{\Delta T_s}{\Delta t} + D\rho_i C_i d_i \frac{\left(\frac{T_s + T_g}{2}\right)}{\Delta t} = D \frac{k_i}{d_i} (T_g - T_s) \quad (D-2)$$

where d_i is the insulation thickness, T_g is the gas temperature, T_s is the steel temperature, W is the weight per unit length of the steel member and D is the heated perimeter of the member. Subscript "s" is for steel and subscript "i" is for insulation. The boundary condition is set as the gas temperature at the surface for the analytical expression, whereas for the ABAQUS analyses a total heat transfer coefficient of $45 \text{ W/m}^2\text{K}$ is specified at the gas-solid interfaces.

Figure D-2 shows a comparison between the average steel temperature calculated using Equation D-1 and the flange and web temperatures calculated with the ABAQUS 2-D model for a Case (A) scenario. This comparison shows that the temperatures calculated in the ABAQUS 2-D model are relatively uniform and similar to the temperatures calculated using Equation D-1. Based on these results, Equation D-1 was used to calculate the Case (A) results for all the steel elements.

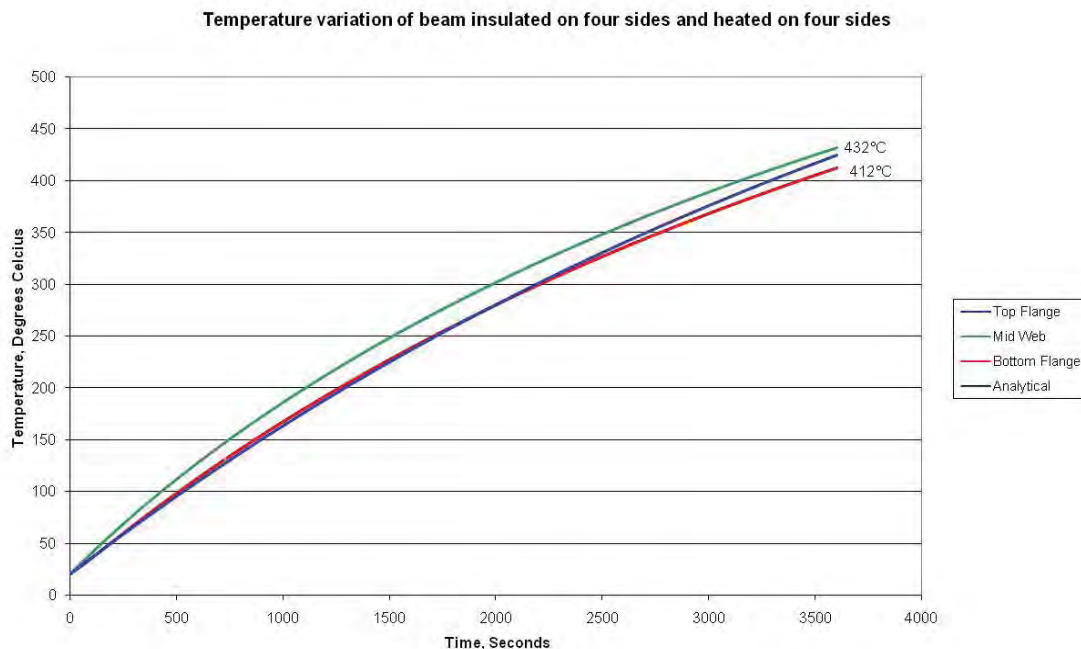


Figure D-2. Comparison between ABAQUS 2D Model and analytical formulation for Case (A).

To generate the temperature histories for the same section for the other cases ((B), (C) and (D)), correction factors were developed to modify the time of the solution for case (A) to obtain the heating times of the other cases. This is based on the concept of characteristic times depending on the W/D ratio. For the same W/D ratio the characteristic times can be scaled and thus this correction can be used to generate the temperature vs time curves for all other scenarios analyzed.

The correction factors were developed in the following manner. From the 2-D ABAQUS analysis for cases (B) and (C) and the 3D ABAQUS analysis for case (D), the following temperatures were obtained for a single case for each section:

TB (TB1 (Top), TB2 (Middle), TB3 (Bottom)), TC (TC1 (Top), TC2 (Middle), TC3 (Bottom)) and TD (TD1 (Top), TD2 (Middle), TD3 (Bottom))

The three TB temperatures (TB1, TB2 and TB3) were then averaged to produce a single temperature to represent the Case (B) temperature. Based on the ABAQUS results, the time to reach a series of fixed temperatures (20, 50, 100, 150, 200, 250, 300, etc.) is established for all cases and normalized by the times of case (A). In this way, the ratios t_B/t_A , t_{C1}/t_A , t_{C2}/t_A , t_{C3}/t_A and t_{D1}/t_A , t_{D2}/t_A , t_{D3}/t_A are obtained. The correction factors determine in this way are: $t_B/t_A = 1.078$; $t_{C1}/t_A = 0.248$; $t_{C2}/t_A = 0.865$; $t_{C3}/t_A = 1.049$; $t_{D1}/t_A = 0.516$; $t_{D2}/t_A = 0.846$; $t_{D3}/t_A = 1.035$. For Cases (B), (C) and (D), these ratios are used to scale the time of heating and cooling based on the Case (A) results. For example, for Case (B) first the heating is scaled for the hour of heating as $(t^*(t_B/t_A))$. Cooling is then scaled for the second hour as $(3600+(t-3600)*(t_B/t_A))$. This process allows the generation of all the temperature curves for all the cases studied.

Results

The heat transfer analyses of primary interest for beams are those under boundary condition for Cases (B) and (D) and exposure conditions of 700°C and 800°C. The heat transfer analyses for columns and floor slabs are also of interest for use in the structural fire analyses performed by Arup. The results of these heat transfer analyses were passed to Arup for its structural fire analysis. Some representative results are presented here. The full set of results are available electronically in Excel spreadsheets.

Figure D-3 shows the calculated temperature history for a W24x55 beam under boundary conditions for Cases (B) and (D) for an 800°C exposure for 1 hour. Figure D-4 shows the calculated temperature history for a W33x130 girder under the same boundary and exposure conditions. Figure D-5 shows the calculated temperature for a W14x730 column under boundary condition A for an 800°C exposure for 1 hour. Figure D-6 shows the calculated temperatures in a 4 in. floor slab for an 800°C exposure for 1 hour.

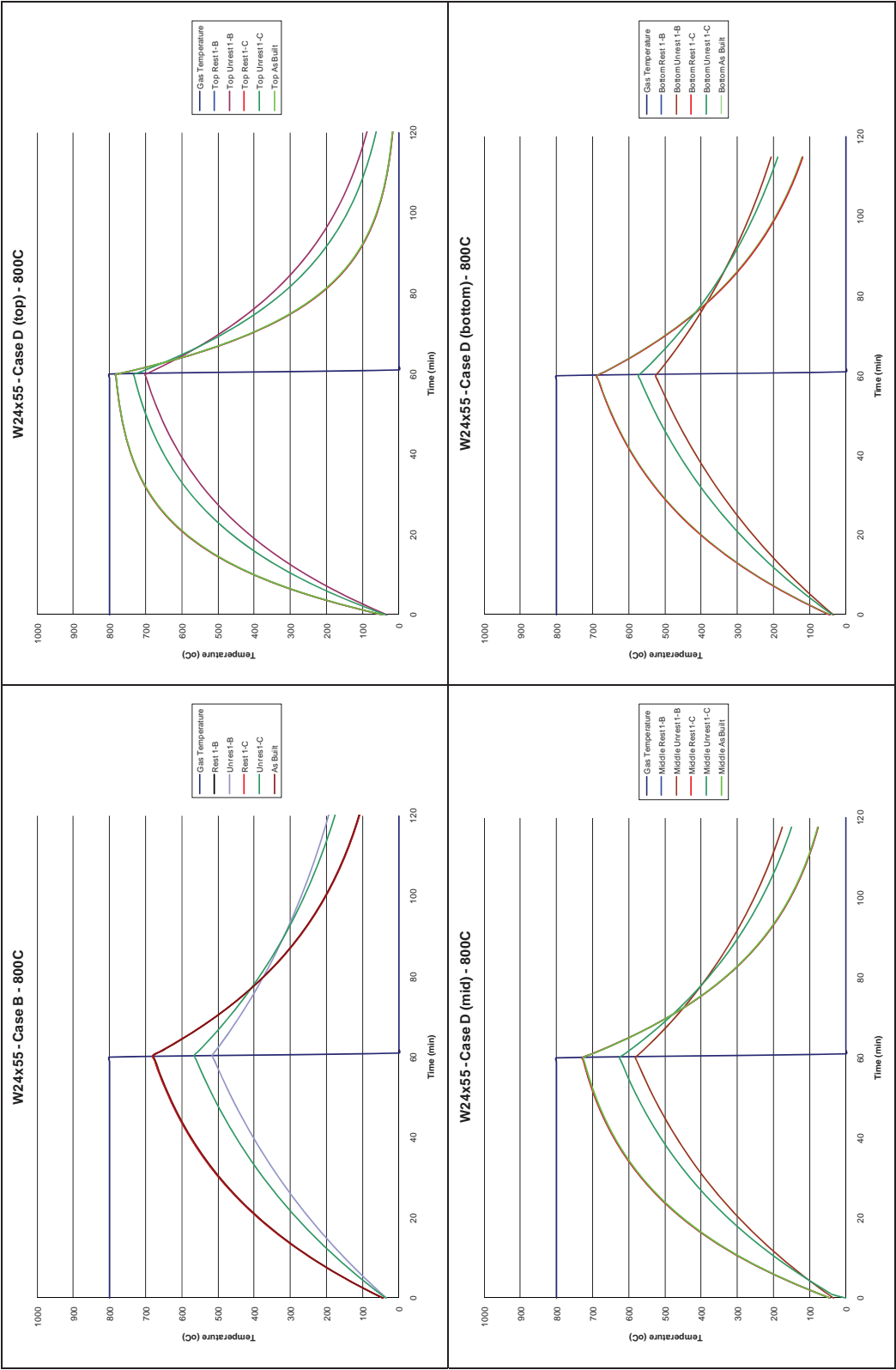


Figure D-3. Temperature histories for a W24x55 beam for Cases (B) and (D) under exposure to a gas temperature of 800°C for 1 hour.

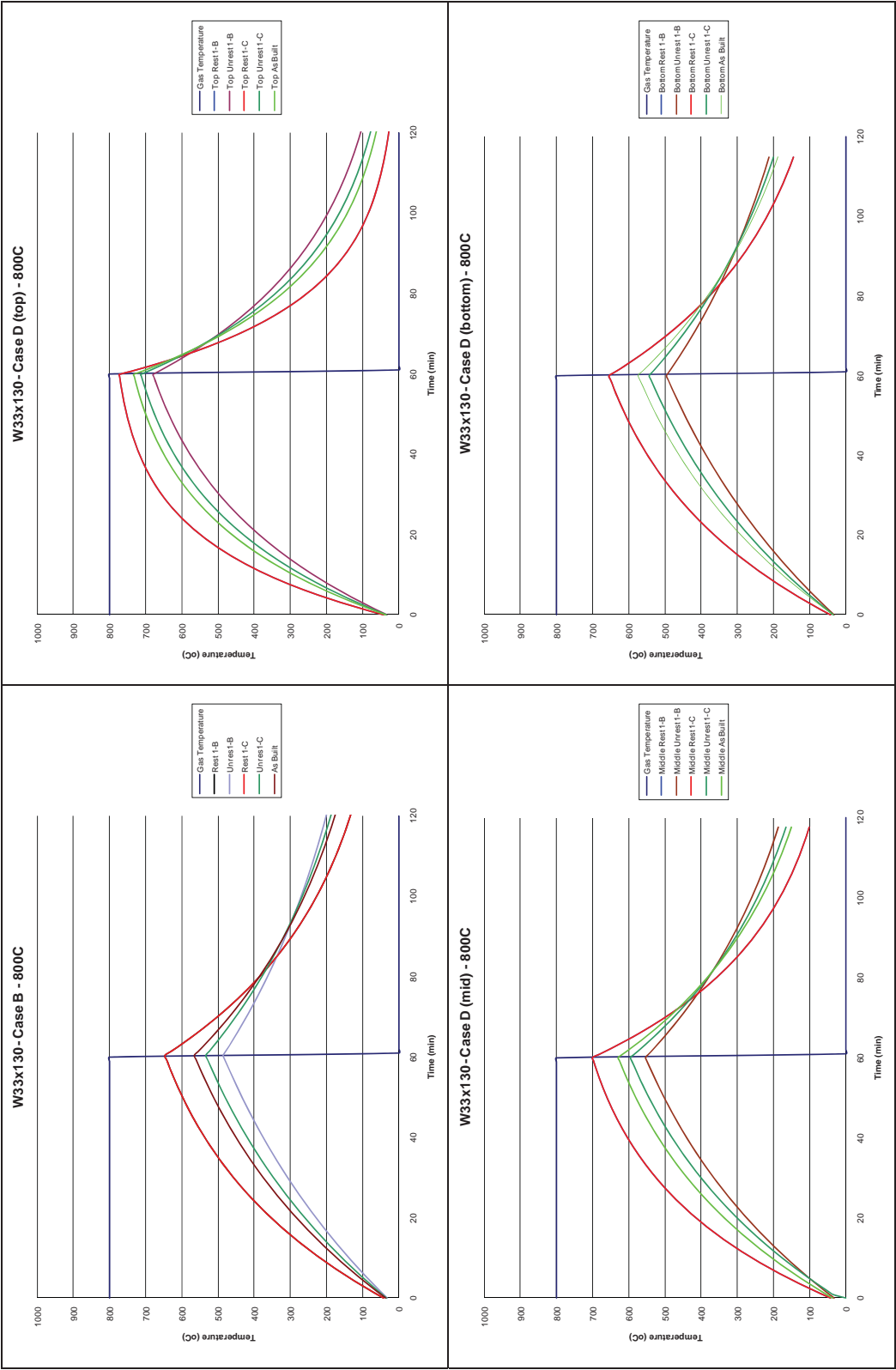


Figure D-4. Temperature histories for a W33x130 girder for Cases (B) and (D) under exposure to a gas temperature of 800°C for 1 hour.

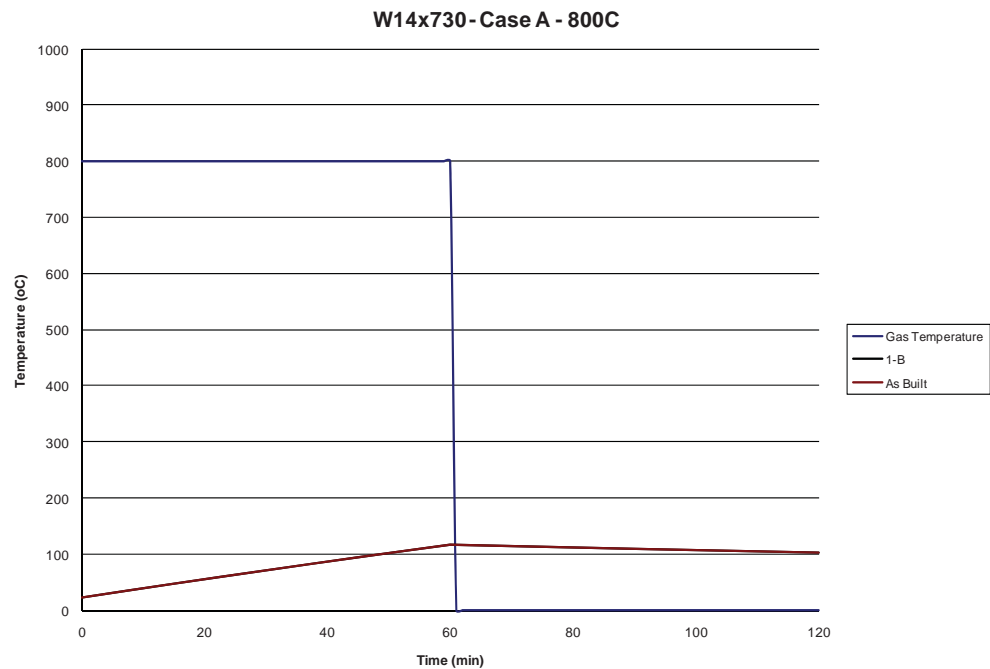


Figure D-5. Temperature history for a W14x730 column for Case (A) under exposure to a gas temperature of 800°C for 1 hour.

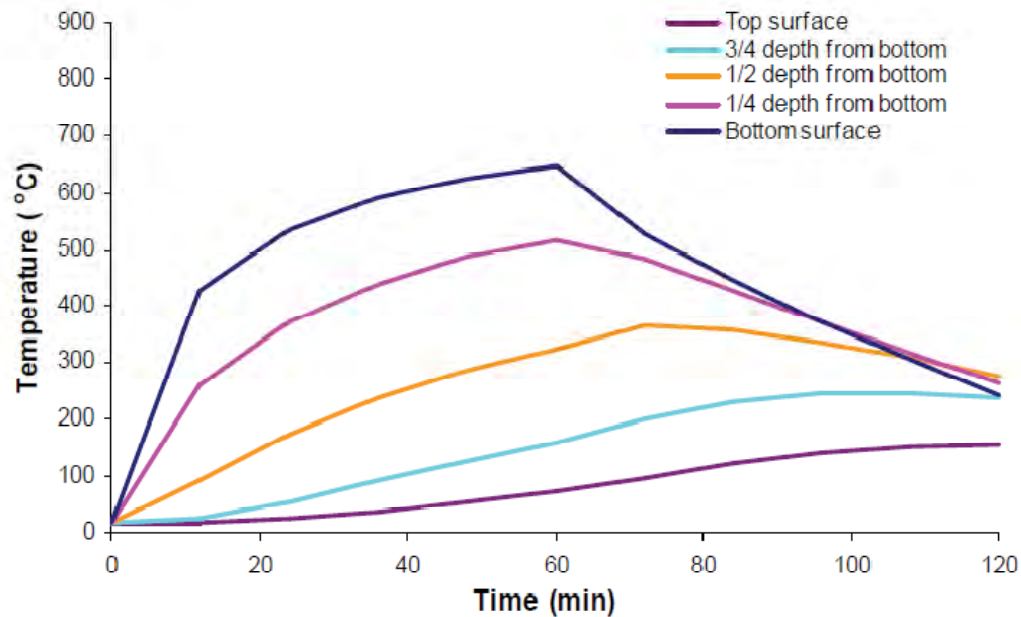


Figure D-6. Temperature distribution through a 4 in. concrete slab under exposure to a gas temperature of 800°C for 1 hour.

Table D-1. Section sizes and associated dimensions and properties for steel beams.

Steel Section	Depth (in)	Web Thickness (in)	Full Width (in)	Flange Thickness (in)	Steel Area (in ²)	Steel Perimeter (in)	W (lb/ft)	W/D (lb/ft/in)
L6x4x3/8	6.00	0.38	4.00	0.38	3.61	20.00	12.30	0.615
W5x19	5.15	0.27	5.03	0.43	5.48	24.85	19.00	0.765
W8x10	7.89	0.17	3.94	0.21	2.89	27.26	10.00	0.367
W12x14	11.91	0.20	3.97	0.23	4.08	35.33	14.00	0.396
W12x19	12.16	0.24	4.01	0.35	5.50	35.87	19.00	0.530
W12x26	12.22	0.23	6.49	0.38	7.57	43.45	26.00	0.598
W14x22	13.74	0.23	5.00	0.34	6.36	42.02	22.00	0.524
W14x26	13.91	0.26	5.03	0.42	7.55	42.39	26.00	0.613
W16x26	15.69	0.25	5.50	0.35	7.55	47.38	26.00	0.549
W16x31	15.88	0.28	5.53	0.44	8.99	47.79	31.00	0.649
W16x40	16.01	0.31	7.00	0.51	11.64	52.40	40.00	0.763
W18x35	17.70	0.30	6.00	0.43	10.16	52.80	35.00	0.663
W18x40	17.90	0.32	6.02	0.53	11.62	53.22	40.00	0.752
W21x44	20.66	0.35	6.50	0.45	12.77	60.12	44.00	0.732
W21x50	20.83	0.38	6.53	0.54	14.50	60.49	50.00	0.827
W21x57	21.06	0.41	6.56	0.65	16.52	60.98	57.00	0.935
W24x55	23.57	0.40	7.01	0.51	15.99	67.37	55.00	0.816
W24x62	23.74	0.43	7.04	0.59	18.01	67.74	62.00	0.915
W24x76	23.92	0.44	8.99	0.68	22.15	73.93	76.00	1.028
W27x84	26.71	0.46	9.96	0.64	24.45	82.38	84.00	1.020
W27x94	26.92	0.49	9.99	0.75	27.35	82.83	94.00	1.135
W30x116	30.01	0.57	10.50	0.85	33.84	90.38	116.00	1.284
W30x99	29.65	0.52	10.45	0.67	28.72	89.61	99.00	1.105
W33x130	33.09	0.58	11.51	0.86	37.88	99.55	130.00	1.306
W36x135	35.55	0.60	11.95	0.79	39.26	105.75	135.00	1.277
W36x230	35.90	0.76	16.47	1.26	66.87	119.69	230.00	1.922
W36x245	36.08	0.80	16.51	1.35	71.28	120.09	245.00	2.040
W36x300	36.74	0.95	16.66	1.68	87.50	121.56	300.00	2.468

Table D-2. Dimensions and properties for built-up girders and columns.

Steel Section	Depth (in)	Web Thickness (in)	Width (in)	Flange Thickness (in)	Steel Area (in ²)	Steel Perimeter (in)	W (lb/ft)	W/D (lb/ft/in)
W14x426	18.67	1.88	16.70	3.04	124.96	100.37	426.00	4.24
W14x455	19.02	2.02	16.84	3.21	133.47	101.35	455.00	4.49
W14x500	19.60	2.19	17.01	3.50	146.66	102.86	500.00	4.86
W14x500 + 2 Fl Pl 16x1.25	19.60	2.19	17.01	3.50	186.66	103.82	500.00	4.82
W14x550	20.24	2.38	17.20	3.82	161.40	104.52	550.00	5.26
W14x550 + 2 Fl Pl 16x1.25	20.24	2.38	17.20	3.82	201.40	104.72	550.00	5.25
W14x550 + 2 Web Pl 12x1	20.24	2.38	17.20	3.82	185.40	125.72	550.00	4.37
W14x605	20.92	2.60	17.42	4.16	177.59	106.31	605.00	5.69
W14x665	21.64	2.83	17.65	4.52	195.21	108.22	665.00	6.14
W14x730	22.42	3.07	17.89	4.91	214.36	110.26	730.00	6.62
W14x730 + 2 Side Pl 26x2	22.42	3.07	17.89	4.91	318.36	102.94	730.00	7.09
W14x730 + 2 Web Pl 12.5x1	22.42	3.07	17.89	4.91	239.36	131.46	730.00	5.55
W14x730 + 2 Web Pl 12.5x4	22.42	3.07	17.89	4.91	314.36	119.46	730.00	6.11
W14x730 + 2 Web Pl 12.5x5	22.42	3.07	17.89	4.91	339.36	115.46	730.00	6.32
W14x730 + 2 Web Pl 12.5x6	22.42	3.07	17.89	4.91	364.36	111.46	730.00	6.55
W14x730 + 2 Web Pl 26x2	22.42	3.07	17.89	4.91	318.36	127.46	730.00	5.73
W14x730 + 2 Web Pl 26x3	22.42	3.07	17.89	4.91	370.36	123.46	730.00	5.91
36" Plate Girder	36.00	0.75	12.00	1.00	49.50	118.50	168.44	1.42
40" Plate Girder	40.00	0.75	12.00	1.00	52.50	126.50	178.65	1.41

Table D-3. SFRM thicknesses required on steel beams under the current UL D739 listing.

Min Beam Size	Concrete Type	Min Thk In.	Unrestrained Beam Rating Hr	Restrained Assembly Rating Hr
W6X20	LW or NW	1/2(a)	1*	1, 1 1/2 or 2
W6X12	LW or NW	3/4(a)	1*	1, 1-1/2 or 2
W8X28	NW	3/4	1-1/2*	1, 1-1/2, 2 or 3
W8X28	LW	7/8	1-1/2*	1, 1-1/2, 2 or 3
W8X28	NW	7/8	2*	1, 1-1/2, 2, 3 or 4

Table D-4. Calculated SFRM thicknesses (in.) based on current UL adjustment factors for W/D ratios.

Section size	W/D (lb/ft/in)	2-hour Restrained	2-hour Unrestrained	1.5-hour Restrained	1.5-hour Unrestrained	Reference
W12x14	0.405	0.706	1.235	0.706	1.059	UL D739
W12x19	0.54	0.622	1.089	0.622	0.934	UL D739
W12x26	0.61	0.586	1.026	0.586	0.880	UL D739
W14x22	0.534	0.626	1.095	0.626	0.938	UL D739
W14x26	0.628	0.578	1.011	0.578	0.867	UL D739
W21x44	0.75	0.526	0.920	0.526	0.788	UL D739
W21x50	0.838	0.493	0.863	0.493	0.740	UL D739
W24x55	0.83	0.496	0.868	0.496	0.744	UL D739
W24x62	0.934	0.463	0.809	0.463	0.694	UL D739
W27x94	1.15	0.405	0.710	0.405	0.608	UL D739
W33x130	1.32	0.375	0.647	0.375	0.554	UL D739
W36x135	1.29	0.375	0.657	0.375	0.563	UL D739
W36x210	1.96	0.375	0.485	0.375	0.416	UL D739
W36x300	2.5	0.375	0.401	0.375	0.375	UL D739
W8x28	0.819	0.750	0.875	0.625	0.688	UL N706
W8x28	0.819	0.500	0.875	0.500	0.750	UL D739
W6x12	0.526	0.750	#N/A	0.750	#N/A	UL D739

Table D-5. Material properties used for analytical heat transfer calculations.

Material	Conductivity k (W/m.K)	Spec. Heat Cp (J/kg.K)	Density ρ (kg/m3)
Steel	45	600	7850
Concrete	1.6	1000	2400
Insulation			
400°C	0.1352	1302.9	233.2
600°C	0.1622	1400.1	227.5
700°C	0.1759	1434.5	228.6
800°C	0.1895	1468.2	229.6
ASTM Fire	0.2712	1488.4	244.8