

INTERNAL ILLUMINANCE ANALYSIS

in connection with the proposed redevelopment at

**SITE AT NOS.173-174 (BRISTOL & WEST ARCADE)
FRIAR STREET
READING RG1 2DG**

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INTERNAL ILLUMINANCE ANALYSIS

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SITE AT NOS.173-174 (BRISTOL & WEST ARCADE) FRIAR STREET READING RG1 2DG

EXECUTIVE SUMMARY

- 1.1 This Report has been commissioned by Messrs. Mountley Limited to accompany the Application for *Prior Notification requirement under Part MA of the GPDO for the change of use of Class E space to form 20 apartments*. The proposals considered are those prepared by Messrs. JDW Architects.
- 1.2 Following the publication of the information paper entitled "*Site Layout planning for daylight and sunlight: A guide to good practice*" by the *Building Research Establishment* in 1991, the assessment of daylight and sunlight has been generally carried out in accordance with the criteria set by this publication and which is generally taken to be the accepted basis for such assessment and adopted by most Planning Authorities. This publication has been superseded by the *Second Edition* issued October 2011. The *BRE Second Edition 2011* does give numerical guidelines, but recommends that these should be interpreted flexibly.
- 1.3 Within Paragraph 1.6 of the *BRE Second Edition 2011* it states, *inter alia*, "*The advice given here (sic BRE Second Edition 2011) is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design*".
- 1.4 The criteria against which internal illuminance is considered is detailed within *Appendix C* of the *BRE Second Edition 2011* which is used in conjunction with *BS 8206-2 Code of practice for daylighting* and the *CIBSE Lighting Guide LG10 Daylighting and window design*.
- 1.5 The technical analysis, carried out in accordance with *Appendix C* of the *Building Research Establishment Guidance "Site Layout planning for daylight and sunlight: A guide to good practice" Second Edition* issued October 2011, confirms that the internal illuminance for the proposals will accord with that guidance.

INTRODUCTION

- 2.1 This Report has been commissioned by Messrs. Mountley Limited to accompany the Application for *Prior Notification requirement under Part MA of the GPDO for the change of use of Class E space to form 20 apartments*. The proposals considered are those prepared by Messrs. JDW Architects.
- 2.2 I would confirm that I am a Chartered Building Surveyor working predominately in the field of rights of light including daylight and sunlight assessments. I have an extensive and highly specialised knowledge, in these areas having worked in the past for both Anstey Horne & Co. for five years and Schatunowski Brooks (formerly known as Michael Brooks Associates as it was when I joined, then known as GVA Schatunowski Brooks and now part of Avison Young) for three years, as well as Delva Patman Associates - now known as Delva Patman Redler LLP - for four years prior to joining in Partnership Dixon Payne in 2001. All are acknowledged Experts in these fields; I now act under my own banner.
- 2.3 I regularly provide Expert Witness advice in respect of Planning Applications in respect of daylight and sunlight at Planning Inquiries acting for both Appellants and Planning Authorities. I was consulted by the *Building Research Establishment* prior to the revision of their guidelines in 2011 and am part of the further consultation about further revisions currently being considered following the publication of *BS EN 17037:2018*.
- 2.4 The analysis and assessments are described in more detail in subsequent sections of this Report.
- 2.5 The proposals considered are for the refurbishment of the existing building to create 6nr residential units on three floors as shown on drawings prepared by Messrs. JDW Architects.
- 2.6 The technical analysis has used a 3D model survey model prepared by Messrs. ZMapping of the surrounding properties with the 3D modelling of the proposed Flats being constructed from reference to the Architects' drawings.

INTERNAL ILLUMINANCE

- 3.1 Following the publication of the information paper entitled "*Site Layout planning for daylight and sunlight: A guide to good practice*" by the *Building Research Establishment* in 1991, the assessment of daylight and sunlight has been generally carried out in accordance with the criteria set by this publication and which is generally taken to be the accepted basis for such assessment and adopted by most Planning Authorities. This publication has been superseded by the *Second Edition* issued *October 2011*. The *BRE Second Edition 2011* does give numerical guidelines, but recommends that these should be interpreted flexibly. Paragraph 1.6 of the *BRE Second Edition 2011* states in entirety "*The guide is intended for building designers and their clients, consultants and planning officials. The advice given here (sic BRE Second Edition 2011) is not mandatory and the guide should not be an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or on an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings. Alternatively, where natural light is of special importance in a building, less obstruction and hence more sunlight and daylight may be deemed necessary. The calculation methods in Appendices A, B and G are entirely flexible in this regard. Appendix F gives advice on how to develop a consistent set of target values for skylight under such circumstances, and Appendix C shows how to relate these to interior daylighting requirements.*
- 3.2 The criteria against which internal illuminance is considered is detailed within *Appendix C* of the *BRE Second Edition 2011* which is used in conjunction with *BS 8206-2 Code of practice for daylighting* and the *CIBSE Lighting Guide LG10 Daylighting and window design*. The guide states that where a predominately daylit appearance is required, the *ADF* should be at least 5% or more if there is no supplementary electric lighting or 2% or more there is. In respect of kitchens, living rooms and bedrooms there are additional recommendations of 2%, 1.5% and 1% respectively. *BS8206-2* further advises that achieving 2% if in living room will give an improved daylight provision whilst 3% - 4% would improve the situation further.
- 3.3 For the detailed technical analysis, in accordance with the *BRE Second Edition 2011*, the 3D model as previously described was utilized and, using specialist computer programmes, calculated the quantum of daylight received to the proposed fenestration of property and individual flats calculated by way of Waldram analysis as detailed within *Appendix B* of the *BRE Second Edition 2011*.

- 3.4 By way of explanation, Percy J. Waldram invented the Waldram diagram as a method of showing on a 2d image the curved and three-dimensional view of the sky from a fixed point. The area of a Waldram diagram drawn to scale is 396cm² which represents the total amount of unobscured sky that can be seen from a vertical plane. The vertical edges of any obstructions are plotted as vertical lines on the diagrams by reference to their angle from the reference point. The head of any obstruction are plotted along the droop line corresponding to their altitudes above the horizontal measured in the section perpendicular to the reference point.

- 3.5 The *ADF* of a room is calculated using the following formula:-

$$ADF = \frac{TM A_w \theta}{A(1-R_{sq})}$$

T = Diffuse visible transmittance of the glazing; assumed 0.68 for clear double glazing

M = Maintenance factor 0.8

A_w = Area of glazing

A = Total surface area of room

R = Average reflectance; 0.5 for assumed light coloured surfaces

Theta = Vertical sky component of window in average daylight factor.

- 3.6 The detailed results for the ground floor are attached and provides that all units accord with the guidance of *Appendix C* in respect of internal illuminance.
- 3.7 By way of clarification, Paragraph 2.1.14 of the *BRE Second Edition 2011* provides that a small internal galley-type kitchen can be provided, but it should be directly linked to a well daylight living room, i.e. an internal illuminance above 1.5% *ADF*.

CONCLUSION

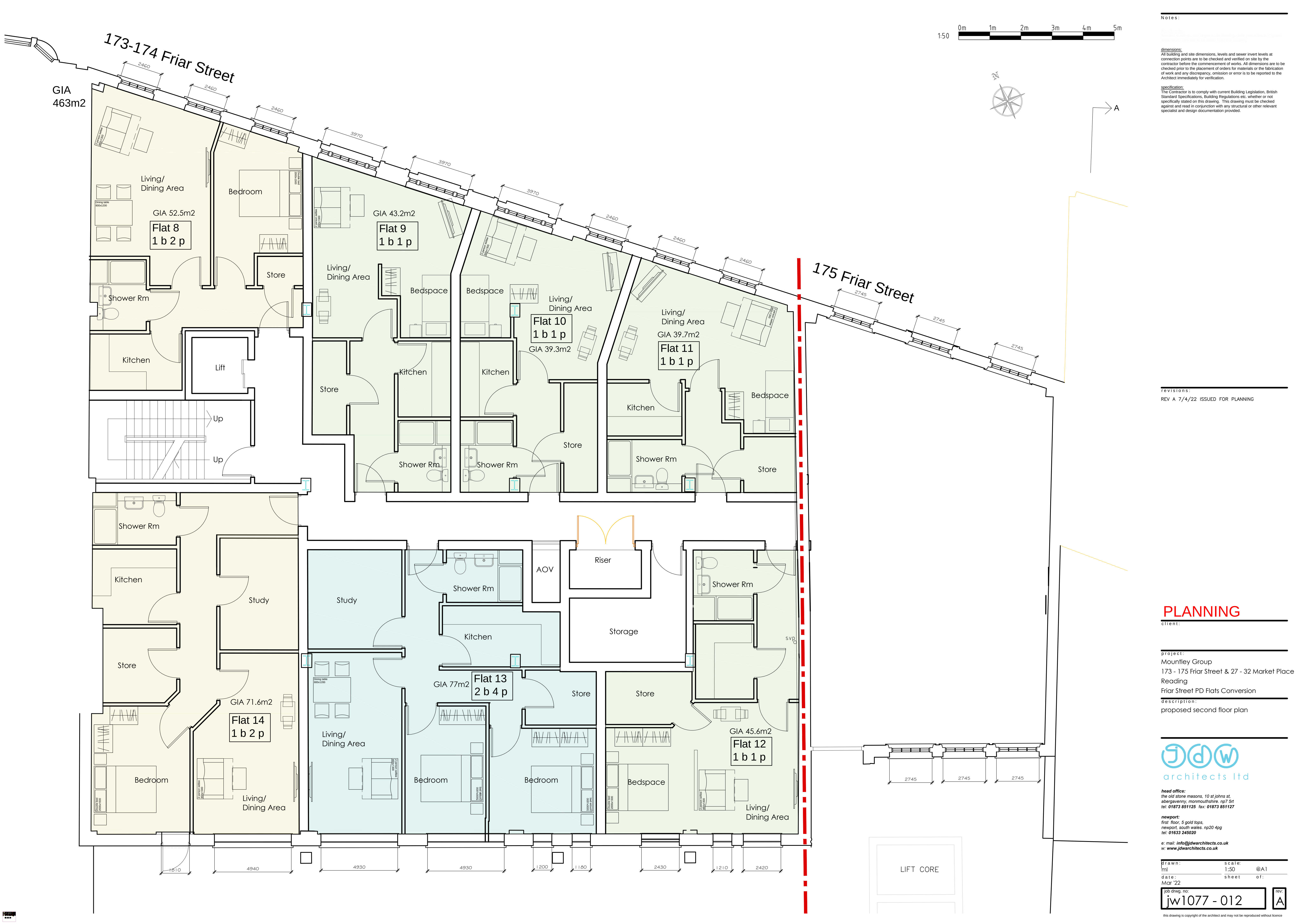
- 4.1 Following the publication of the information paper entitled "*Site Layout planning for daylight and sunlight: A guide to good practice*" by the *Building Research Establishment* in 1991, the assessment of daylight and sunlight has been generally carried out in accordance with the criteria set by this publication and which is generally taken to be the accepted basis for such assessment and adopted by most Planning Authorities. This publication has been superseded by the *Second Edition* issued October 2011. The *BRE Second Edition 2011* does give numerical guidelines, but recommends that these should be interpreted flexibly. Paragraph 1.6 of the *BRE Second Edition 2011* states in entirety "*The guide is intended for building designers and their clients, consultants and planning officials. The advice given here (sic BRE Second Edition 2011) is not mandatory and the guide should not be an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design. In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or on an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings. Alternatively, where natural light is of special importance in a building, less obstruction and hence more sunlight and daylight may be deemed necessary. The calculation methods in Appendices A, B and G are entirely flexible in this regard. Appendix F gives advice on how to develop a consistent set of target values for skylight under such circumstances, and Appendix C shows how to relate these to interior daylighting requirements.*
- 4.2 The criteria against which internal illuminance is considered is detailed within *Appendix C* of the *BRE Second Edition 2011* which is used in conjunction with *BS 8206-2 Code of practice for daylighting* and the *CIBSE Lighting Guide LG10 Daylighting and window design* and the technical analysis confirms that the internal illuminances of the proposed residential dwellings accord with that guidance.

April 14, 2022

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APPENDIX – LAYOUT DRAWING, RESULTS & WALDRAM DIAGRAMS



Notes:

dimensions:
All building and site dimensions, levels and sewer invert levels at connection points are to be checked and verified on site by the contractor before the commencement of works. All dimensions are to be checked prior to the placement of orders for materials or the fabrication of work and any discrepancy, omission or error is to be reported to the Architect immediately for verification.

specification:
The Contractor is to comply with current Building Legislation, British Standard Specifications, Building Regulations etc, whether or not specifically stated on this drawing. This drawing must be checked against and read in conjunction with any structural or other relevant specialist and design documentation provided.

revisions:

REV A 7/4/22 ISSUED FOR PLANNING

PLANNING

client:

project:

Mountley Group
173 - 175 Friar Street & 27 - 32 Market Place
Reading
Friar Street PD Flats Conversion

description:

proposed second floor plan

jdw
architects ltd

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date: sheet of:
Mar '22

job drwg. no: **jw1077 - 012** rev: **A**

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Notes:

dimensions:
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revisions:

REV A 7/4/22 ISSUED FOR PLANNING

PLANNING

client:
Mounley Group

project:

173 - 175 Friar Street & 27 - 32 Market Place
Reading
Friar Street PD Flats Conversion
description:
proposed third floor plan



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the old stone masons, 10 st Johns St,
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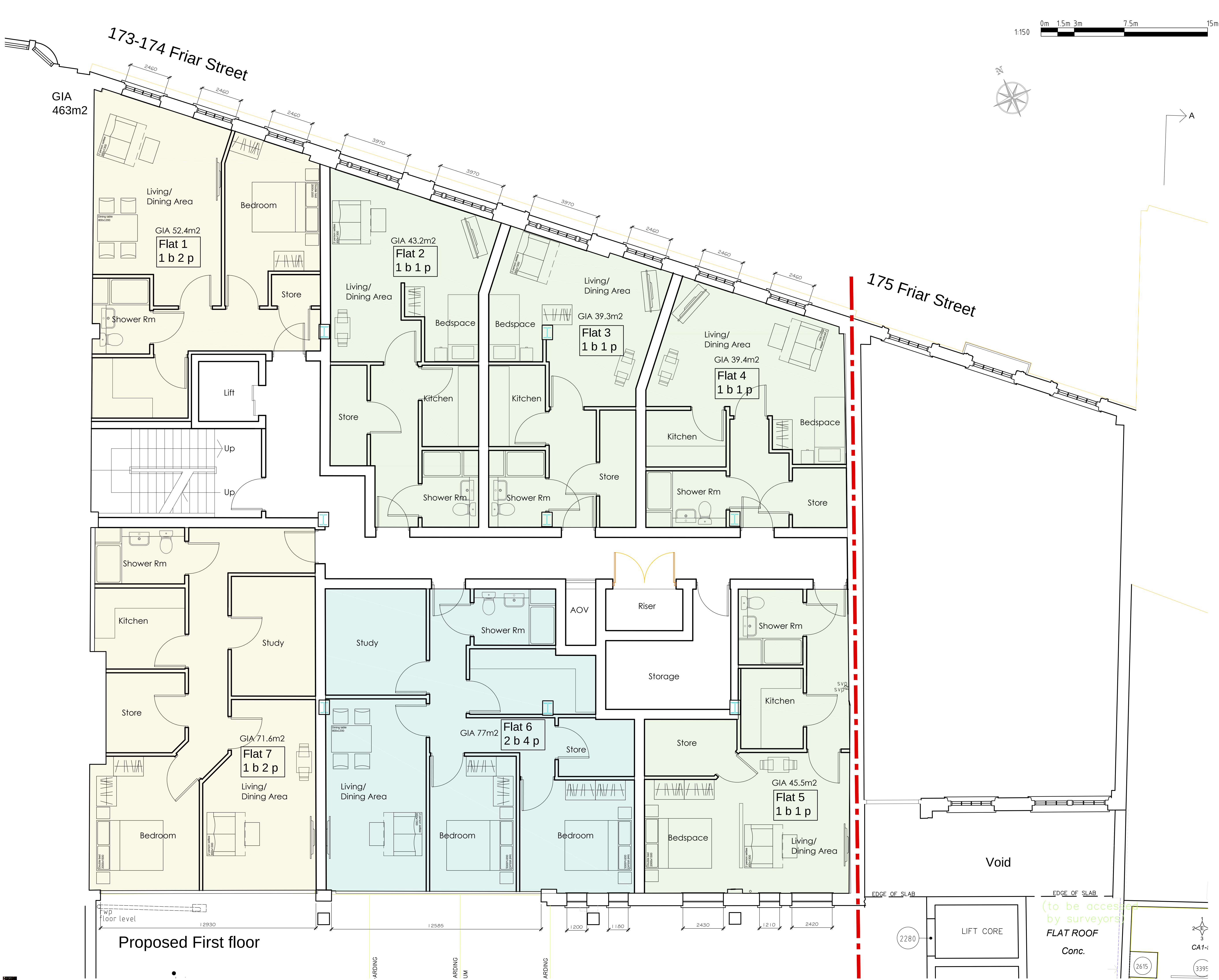
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e: mail: info@jdwarehitects.co.uk
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Mar '22

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jw1077 - 013 A

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revisions:
REV A 7/4/22 ISSUED FOR PLANNING

PLANNING

client:
Mounley Group

project:
173 - 175 Friar Street & 27 - 32 Market Place
Reading
Friar Street PD Flats Conversion

description:
proposed first floor plan

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architects ltd

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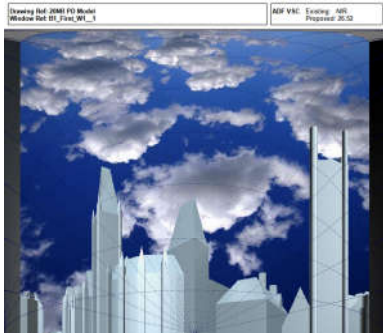
BRE SECOND EDITION 2011
173-174 FRIAR STREET READING
INTERNAL ILLUMINANCE

Room Name	Room Use	Window Ref	Glass Transmittance	Glazed Area	Clear Sky Pr	Room Surface Area	Average Surface Reflectance	Below Working Plane Factor	ADF Pr	Reqd Val	Meets BRE Criteria
R1	Living	W1-L	0.68	0.288686	63.594178	125.267822	0.5	0.15	0.018337	1.5	YES
R1	Living	W1-U	0.68	2.051978	61.951596	125.267822	0.5	1	0.846489		
R1	Living	W2-L	0.68	0.288683	63.241438	125.267822	0.5	0.15	0.018235		
R1	Living	W2-U	0.68	2.05196	61.575006	125.267822	0.5	1	0.841336		
									1.724396		
R2	Bedroom	W3-L	0.68	0.288681	62.903861	83.407588	0.5	0.15	0.027241	1	YES
R2	Bedroom	W3-U	0.68	2.051942	61.230989	83.407588	0.5	1	1.256511		
									1.283751		
R3	Studio	W4-L	0.68	0.469447	63.626317	141.830296	0.5	0.15	0.02635	1.5	YES
R3	Studio	W4-U	0.68	3.336831	59.618888	141.830296	0.5	1	1.169997		
R3	Studio	W5-L	0.68	0.469468	63.196523	141.830296	0.5	0.15	0.026173		
R3	Studio	W5-U	0.68	3.336976	59.500643	141.830296	0.5	1	1.167727		
									2.390246		
R4	Studio	W6-L	0.68	0.469461	61.708928	122.7047	0.5	0.15	0.02954	1	YES
R4	Studio	W6-U	0.68	3.336931	57.63886	122.7047	0.5	1	1.307485		
R4	Studio	W7-L	0.68	0.288618	59.282038	122.7047	0.5	0.15	0.017447		
R4	Studio	W7-U	0.68	2.051497	57.486525	122.7047	0.5	1	0.801699		
									2.156171		
R5	Studio	W8-L	0.68	0.288635	57.539014	130.979465	0.5	0.15	0.015865	1.5	YES
R5	Studio	W8-U	0.68	2.05162	55.788192	130.979465	0.5	1	0.728906		
R5	Studio	W9-L	0.68	0.288657	53.936925	130.979465	0.5	0.15	0.014873		
R5	Studio	W9-U	0.68	2.051776	52.320076	130.979465	0.5	1	0.683645		
									1.443288		
R6	Studio	W10	0.68	1.875255	47.255014	148.934381	0.5	1	0.496305	1.5	
R6	Studio	W11	0.68	0.938404	41.562104	148.934381	0.5	1	0.218438		
R6	Studio	W12	0.68	1.884561	55.215379	148.934381	0.5	1	0.582788		
									1.297531		
R7	Bedroom	W13	0.68	0.914076	53.766471	77.727136	0.5	1	0.52742	1	YES
R7	Bedroom	W14	0.68	0.928958	55.806682	77.727136	0.5	1	0.556346		
R7	Bedroom	W15-L	0.68	5.089427	71.152217	77.727136	0.5	0.15	0.582923		
R7	Bedroom	W15-U	0.68	10.657858	72.66264	77.727136	0.5	1	8.310821		
									9.97751		
R8	Bedroom	W15-L	0.68	5.089427	70.996216	73.45081	0.5	0.15	0.615509	1	YES
R8	Bedroom	W15-U	0.68	10.657858	71.522875	73.45081	0.5	1	8.656728		
									9.272237		
R9	Living	W15-L	0.68	5.089427	71.152217	129.78757	0.5	0.15	0.349101	1.5	YES
R9	Living	W15-U	0.68	10.657858	72.66264	129.78757	0.5	1	4.977181		
									5.326282		

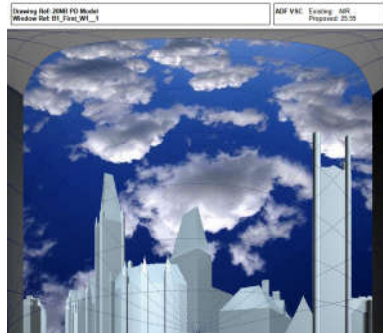
R10	Living	W16-L	0.68	5.228236	69.565018	114.555975	0.5	0.15	0.397242		
R10	Bedroom	W16-U	0.68	10.948541	69.991525	114.555975	0.5	1	5.57981		
									5.977052	1.5	YES
R11	Bedroom	W16-L	0.68	5.228236	69.726452	83.172107	0.5	0.15	0.548405		
R11	Bedroom	W16-U	0.68	10.948541	71.174103	83.172107	0.5	1	7.815127		
									8.363532	1	YES
R1	Living	W2	0.68	1.962835	64.730841	125.267822	0.5	1	0.84604		
R1	Living	W1	0.68	1.962835	65.203142	125.267822	0.5	1	0.852213		
									1.698253	1.5	YES
R2	Bedroom	W3	0.68	1.962835	64.222355	83.407588	0.5	1	1.260666		
									1.260666	1	YES
R3	Bedroom	W5	0.68	3.184487	60.185476	141.830296	0.5	1	1.127191		
R3	Bedroom	W4	0.68	3.184487	61.305606	141.830296	0.5	1	1.14817		
									2.275361	1	YES
R4	Studio	W7	0.68	1.962835	60.038689	122.7047	0.5	1	0.801105		
R4	Studio	W6	0.68	3.184487	58.393049	122.7047	0.5	1	1.264081		
									2.065186	1.5	YES
R5	Studio	W9	0.68	1.962835	57.101258	130.979465	0.5	1	0.713776		
R5	Studio	W8	0.68	1.962835	58.952466	130.979465	0.5	1	0.736916		
									1.450692	1.5	
R6	Studio	W12	0.68	1.884561	70.946749	148.934381	0.5	1	0.74883		
R6	Studio	W11	0.68	0.938404	61.985855	148.934381	0.5	1	0.325779		
R6	Studio	W10	0.68	1.875255	70.903868	148.934381	0.5	1	0.744682		
									1.819291	1.5	YES
R7	Studio	W15	0.68	3.824961	78.642812	77.727136	0.5	1	3.228114		
R7	Studio	W14	0.68	0.928958	61.321957	77.727136	0.5	1	0.611329		
R7	Studio	W13	0.68	0.914076	61.127563	77.727136	0.5	1	0.599628		
									4.439071	1.5	YES
R8	Bedroom	W15	0.68	3.824961	74.061589	73.45081	0.5	1	3.217058		
									3.217058	1	YES
R9	Bedroom	W16	0.68	3.824934	73.787653	129.78757	0.5	1	1.813886		
									1.813886	1	YES
R10	Living	W17	0.68	3.832735	73.644483	114.555975	0.5	1	2.05526		
									2.05526	1.5	YES
R11	Bedroom	W18-L	0.68	0.747303	70.263033	83.172107	0.5	0.15	0.07899		
R11	Bedroom	W18-U	0.68	1.564941	69.070853	83.172107	0.5	1	1.084053		
									1.163043	1	YES
R1	Living	W1	0.68	1.962835	68.143346	125.267822	0.5	1	0.890642		
R1	Living	W2	0.68	1.962835	67.634715	125.267822	0.5	1	0.883994		
									1.774636	1.5	YES
R2	Bedroom	W3	0.68	1.962835	67.113035	83.407588	0.5	1	1.317409		

									1.317409	1	YES
R3	Studio	W4	0.68	3.184487	64.147574	141.830296	0.5	1	1.201396		
R3	Studio	W5	0.68	3.184487	62.834855	141.830296	0.5	1	1.176811		
									2.378207	1.5	YES
R4	Studio	W6	0.68	3.184487	61.14041	122.7047	0.5	1	1.323556		
R4	Studio	W7	0.68	1.962835	62.962823	122.7047	0.5	1	0.840122		
									2.163677	1.5	YES
R5	Studio	W8	0.68	1.962835	62.487738	130.979465	0.5	1	0.781108		
R5	Studio	W9	0.68	1.962835	62.105661	130.979465	0.5	1	0.776332		
									1.557439	1.5	YES
R6	Studio	W12	0.68	1.884561	73.547723	152.352913	0.5	1	0.758864		
R6	Studio	W11	0.68	0.938404	63.880796	152.352913	0.5	1	0.328205		
R6	Studio	W10	0.68	1.875255	73.731173	152.352913	0.5	1	0.757001		
									1.844069	1	YES
R7	Bedroom	W15	0.68	3.824961	81.581154	77.725238	0.5	1	3.348808		
R7	Bedroom	W14	0.68	0.928958	63.071128	77.725238	0.5	1	0.628782		
R7	Bedroom	W13	0.68	0.914076	62.884294	77.725238	0.5	1	0.616876		
									4.594466	1	YES
R8	Bedroom	W15	0.68	3.824961	76.732319	73.45081	0.5	1	3.333068		
									3.333068	1	YES
R9	Living	W16	0.68	3.824934	76.305812	129.78757	0.5	1	1.875789		
R9	Living	W17	0.68	2.930783	75.728903	129.78757	0.5	1	1.426421		
R9	Living	W18	0.68	2.73685	75.407926	129.78757	0.5	1	1.326387		
									4.628597	1.5	YES

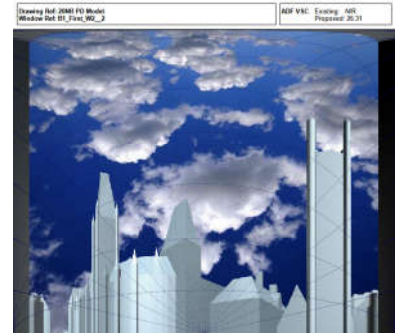
**BRE SECOND EDITION 2011
SITE AT 173-174 FRAIR STREET READING
ADF WALDRAM DIAGRAMS**



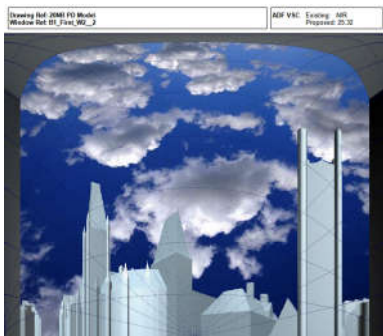
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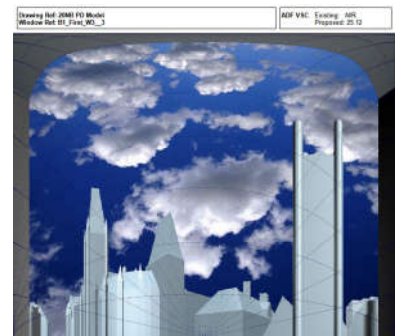
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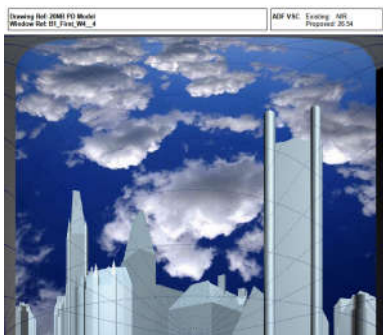
ADFVSC-B1_First_W2__2-U



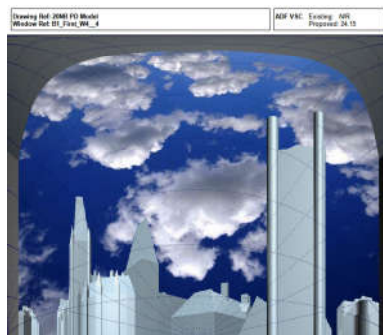
ADFVSC-B1_First_W3__3-B



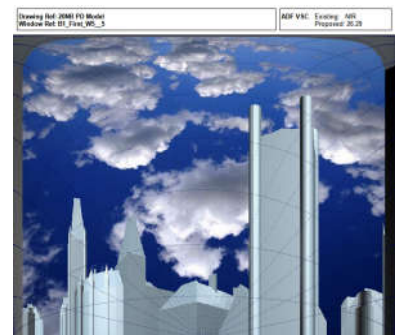
ADFVSC-B1_First_W3__3-U



ADFVSC-B1_First_W4__4-B

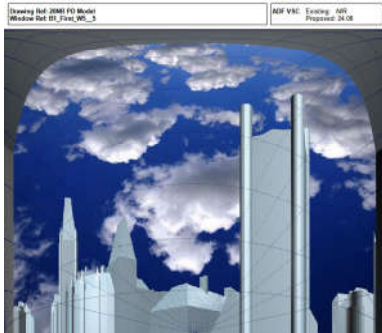


ADFVSC-B1_First_W4__4-U



ADFVSC-B1_First_W5__5-B

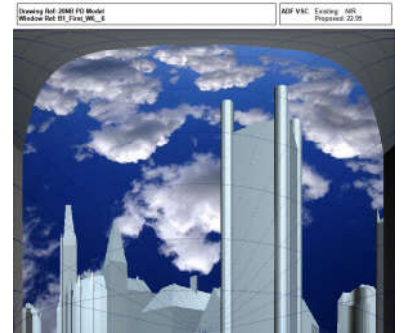
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ADFVSC-B1_First_W5__5-U



ADFVSC-B1_First_W6__6-B



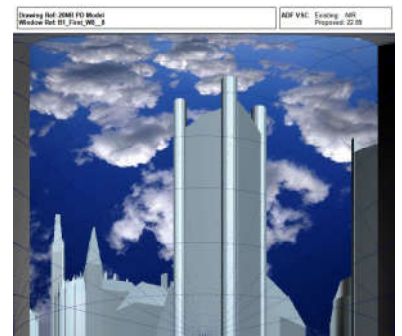
ADFVSC-B1_First_W6__6-U



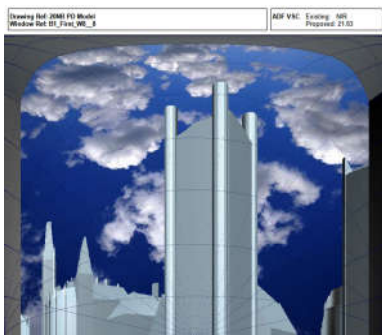
ADFVSC-B1_First_W7__7-B



ADFVSC-B1_First_W7__7-U



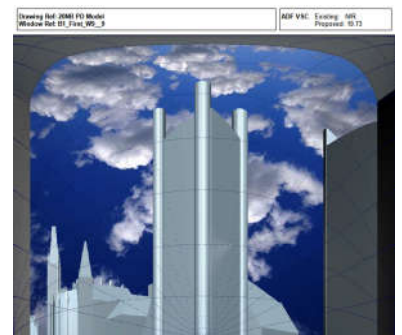
ADFVSC-B1_First_W8__8-B



ADFVSC-B1_First_W8__8-U

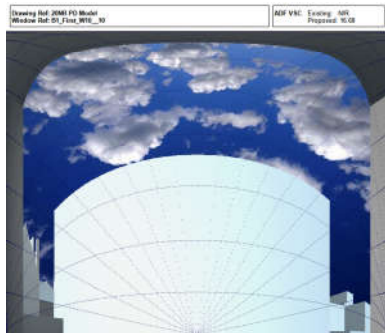


ADFVSC-B1_First_W9__9-B

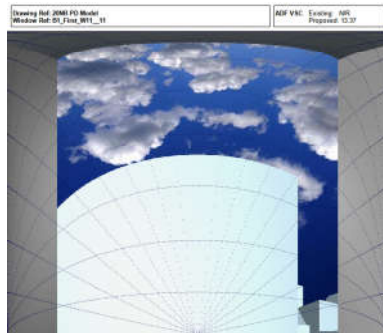


ADFVSC-B1_First_W9__9-U

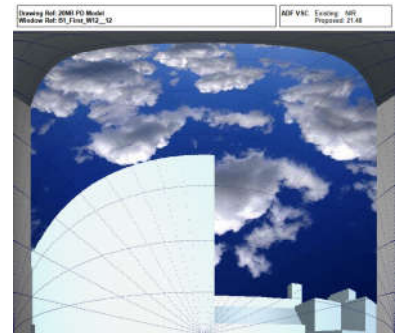
**BRE SECOND EDITION 2011
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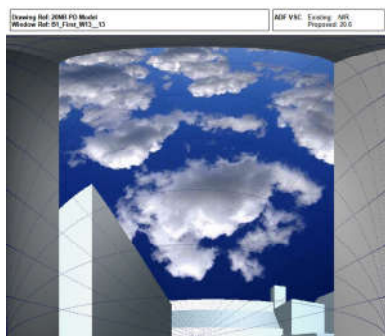
ADFVSC-B1_First_W10__10-C



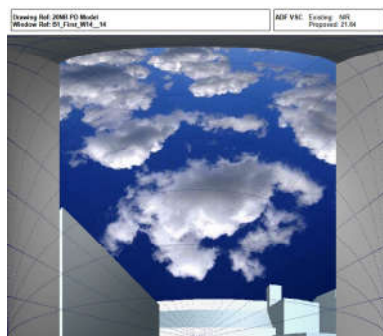
ADFVSC-B1_First_W11__11-C



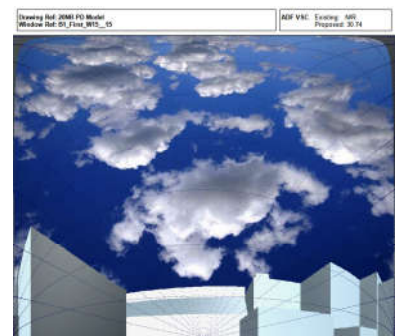
ADFVSC-B1_First_W12__12-C



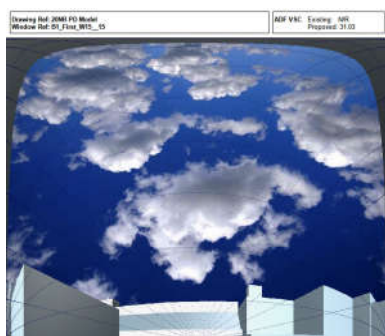
ADFVSC-B1_First_W13__13-C



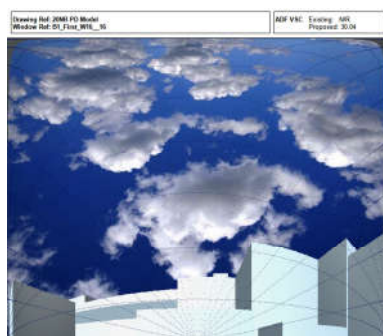
ADFVSC-B1_First_W14__14-C



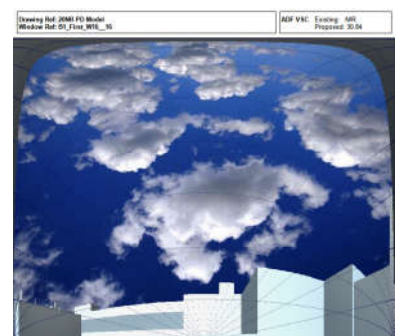
ADFVSC-B1_First_W15__15-B



ADFVSC-B1_First_W15__15-U



ADFVSC-B1_First_W16__16-B

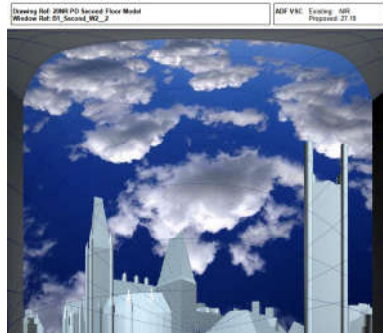


ADFVSC-B1_First_W16__16-U

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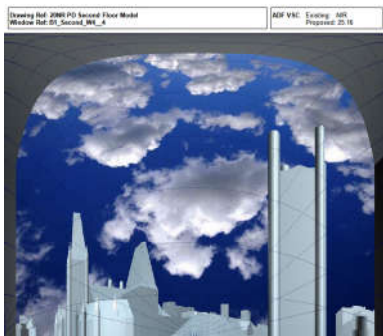
ADFVSC-B1_Second_W1__1-C



ADFVSC-B1_Second_W2__2-C



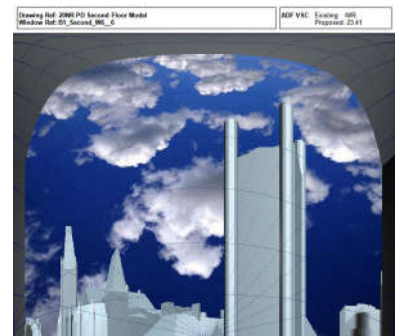
ADFVSC-B1_Second_W3__3-C



ADFVSC-B1_Second_W4__4-C



ADFVSC-B1_Second_W5__5-C



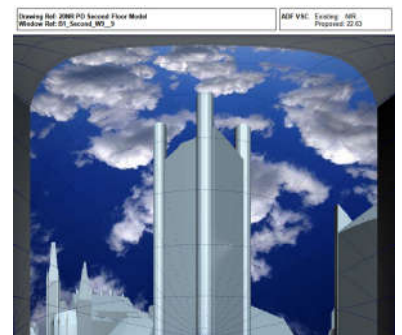
ADFVSC-B1_Second_W6__6-C



ADFVSC-B1_Second_W7__7-C



ADFVSC-B1_Second_W8__8-C



ADFVSC-B1_Second_W9__9-C

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ADFVSC-B1_Second_W10__10-C



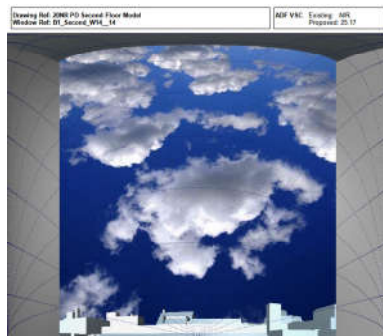
ADFVSC-B1_Second_W11__11-C



ADFVSC-B1_Second_W12__12-C



ADFVSC-B1_Second_W13__13-C



ADFVSC-B1_Second_W14__14-C



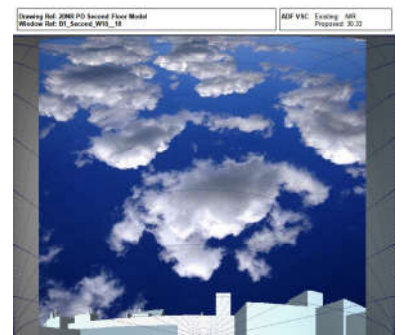
ADFVSC-B1_Second_W15__15-C



ADFVSC-B1_Second_W16__16-C



ADFVSC-B1_Second_W17__17-C

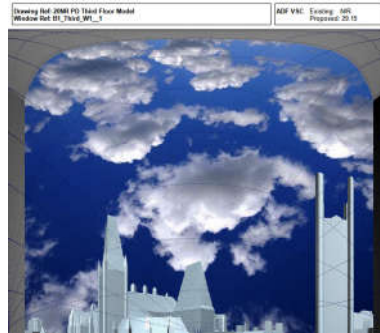


ADFVSC-B1_Second_W18__18-B

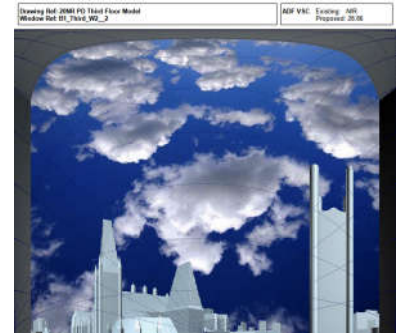
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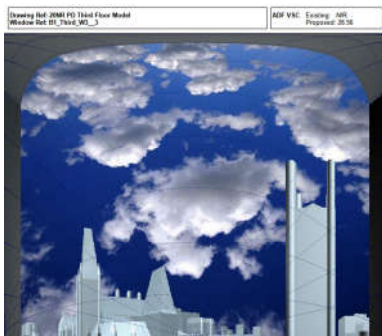
ADFVSC-B1_Second_W18__18-U



ADFVSC-B1_Third_W1__1-C



ADFVSC-B1_Third_W2__2-C



ADFVSC-B1_Third_W3__3-C



ADFVSC-B1_Third_W4__4-C



ADFVSC-B1_Third_W5__5-C



ADFVSC-B1_Third_W6__6-C



ADFVSC-B1_Third_W7__7-C



ADFVSC-B1_Third_W8__8-C

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ADFVSC-B1_Third_W9__9-C



ADFVSC-B1_Third_W10__10-C



ADFVSC-B1_Third_W11__11-C



ADFVSC-B1_Third_W12__12-C



ADFVSC-B1_Third_W13__13-C



ADFVSC-B1_Third_W14__14-C



ADFVSC-B1_Third_W15__15-C



ADFVSC-B1_Third_W16__16-C



ADFVSC-B1_Third_W17__17-C

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SITE AT 173-174 FRAIR STREET READING
ADF WALDRAM DIAGRAMS



ADFVSC-B1_Third_W18__18-C