| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works | | |
|---|---|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 | | |

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|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-001-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status Action | Status Date | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALUMINUM WORKS | WIND LOADS DEFINTION ALL AREAS | 29-Feb-12 | Request by email about the wind loads for the facades and the loads resulting from sunshades location | BELGIUM | AECOM | ACTION | *SKETCHY* | 3-Mar-12 | **No wind load provided**. Parameters provided to calculate wind loads according to ASCE 7-05. **inconsistency of the reply for sunshades.** |
| 2 | ALUMINUM WORKS | WIND LOADS DEFINTION ALL AREAS | 7-Mar-12 | Meeting Between AECOM-AL FARA'A-BELGIUM.**New request of BELGIUM** about the wind load and the consequences on sunshades. **MOM recorded** | BELGIUM | AECOM | ACTION | *NO REPLY* | 7-Mar-12 | Impossibility for AECOM to provide information. Notified in MOM |
| 3 | ALUMINUM WORKS | WIND LOADS DEFINTION ALL AREAS | 14-Mar-12 | Document **AFSD-AL-CN-WLD-001-0 submitted by BELGIUM** about wind loads. BELGIUM hightlights that the **method of calculation is not in compliance with ASCE 7-05.** | BELGIUM | AECOM / DESIGN TEAM | COMMENTS | *NO REPLY* | | **No reply** |
| 4 | ALUMINUM WORKS | WIND LOADS DEFINTION ALL AREAS | 19-Mar-12 | Meeting between ROBSON-SHEPPARD/ AECOM/AL FARA'A/ BELGIUM.Request of BELGIUM for a final decision about the wind loads.**BELGIUM highlights that the compliance with IBC 2009/ASCE 7-05 requires a wind tunnel test. No calculation method are applicable for such a project according ASCE 7-05.** | BELGIUM | AECOM/ SHEPPARD-ROBSON | ACTION | *NO ACTION* | 19-Mar-12 | **David Ardill explained that it was not a part of his scope to provide the wind loads.** He suggest to create a contact between AL FARA'A and RWDI to have a wind tunnel test if require. |
| 5 | ALUMINUM WORKS | WIND LOADS DEFINTION ALL AREAS | 27-Mar-12 | AL FARA'A confirms through the MOM of March 19th and 21st, that wind loads are not provides in specifications and that Wind tunnel test is not in their scopes. | AL FARA'A | ALL | RECORD | *FOR INFO.* | 28-Mar-12 | **David Ardill replied** on March 28th on the subject.From his side, **sufficient information about wind load were provided** whithin specification to meet the level of details required. Additionally, he is considering that **BELGIUM identified specific wind loads to enable their detailled design** and that the **Wind tunnel test is a request of BELGIUM.** |



**OBJECT OF THE R.F.I.**

According to the previous information, BELGIUM is requiring for one month accurate information about the wind loads to carry out the aluminum works. Currently, no reply are provided.

The design of this building is under the UAE Building Code Regulation. Abu Dhabi Building code refers to IBC 2009 and consequently to ASCE 7-05 about the wind loads. ASCE7-05 clearly identifies that no calculation methods are available for such a case and requires a Wind Tunnel Test (please refers to comments insert in document AFSD-AL-CN-WLD-001-0). The Team Design can not ignore this issue. The wind loads identified by BELGIUM are not specifics to their detailled design but are connected to the architecture/design of the building which is under the responsibility and competences of the Team Design. Do not consider these wind loads during the design stage equivalent not to be able to confirm the integrity and the viability of the design suggested through tender drawings and specification. The argumentation of David Ardill is not acceptable.

Therefore, BELGIUM is requiring from Sheppard-Robson or/and AECOM, to provide :

Wind loads for all aluminium works.

Wind loads provisions took for the sunshades on North-West facade to carry out the Design.

Wind loads provisions took for the entrance curtain wall to carry out the Design.

| | |
|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information.Shop drawings delayed due to missing information and lack of replies. Require an urgent action.** |

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works |
|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 |

| | |
|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-002-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Action | Date | |
| 1 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 29-Feb-12 | Request by email about the Acoustic compliance and the inconsistency of the Rw-value provided in the acoustic report. | BELGIUM | AECOM | ACTION | *NO REPLY* | | No accurate information are provided about this issue. |
| 2 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 4-Mar-12 | Document AFSD-CD-RB+CW-001-0 PART 1 forwarded to David Ardill and AECOM about the concept design.The document hightlights again the inconsistency of the Rw-value provided by the Acoustic-report. | BELGIUM | AECOM / DESIGN TEAM | ACTION | *NO REPLY* | | No information provided about this subject. |
| 3 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 7-Mar-12 | Meeting between AECOM/AL FARA'A/ BELGIUM. BELGIUM Hightlights again the issue regarding the Rw-value of Insulated Glazed unit 6-20-6 or 6-16-6. AECOM accepted a result with 33dB which was recorded in the MOM. No confirmation received | BELGIUM | AECOM | COMMENTS | *SKETCHY* | | AECOM accepted during the meeting **33dB,** which was recorded on the MOM, but **never confirmed.** |
| 4 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 12-Mar-12 | Email from Gary Bressan(AECOM) forwarding an Email from M Andreas Nilsson about the acoustic issue confirming that a Rw-Value between 33/35dB for the IGU will normally meet the expectation of Estimada. | AECOM | BELGIUM | INFO | *SKETCHY* | 12-Mar-12 | **This email doesn't reply to the question about the compliance of the Rw-value of the IGU with Estimada.** |
| 5 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 19-Mar-12 | Meeting between SHEPPARD-ROBSONAECOM/AL FARA'A/ BELGIUM. BELGIUM Hightlights again the issue regarding the Rw-value of Insulated Glazed Unit 6-20-6 or 6-16-6 and requested an official position of the Design Team about this issue | BELGIUM | AECOM/ SHEPPARD-ROBSON | ACTION | *NO ACTION* | 19-Mar-12 | **David Ardill suggested that BELGIUM takes contact with Andreas Nilsson to solve this issue.** |
| 6 | ALUMINUM WORKS | ACOUSTIC COMPLIANCE | 26-Mar-12 | According to the preference of David Ardill for the Saint GOBAIN glazing sample (Planitherm), a request was achieve to SGG in France about the Rw-value of this IGU. Awaiting an official certificate from a laboratory. However, SSG confirmed that a 6-16-6 will match a Rw-value of 32dB according to EN717-1 | BELGIUM | ALL | INFO | | | |

**OBJECT OF THE R.F.I.**

According to the previous information, BELGIUM is requiring for one month accurate information about the compliance of the Rw-value of IGU with the Estimada.
BELGIUM submitted the request to AECOM and that is not the scope of BELGIUM to coordinate the reply with the several actors of the Design Team.
THEREFORE,
BELGIUM is requesting an accurate answer about the compliance of an IGU with a Rw-value of 32dB (EN717-1) and the Leq of 50dB(A) requested by the Estimada.

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| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information.(Thickness and weight could change in case of non compliance, impacting on the system design). No IGU are able to be order. Lack of replies generates delays.** |

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works |
|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 |

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|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-003-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Action | Date | |
| **1** | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 7-Mar-12 | Meeting between AECOM/AL FARA'A/BELGIUM. BELGIUM highlights that the identified section for the members of the steel structure (100mmX60mmX8mm) are not available on the local market. MOM recorded. | BELGIUM | AECOM | ACTION | ***NO REPLY*** | | |
| **2** | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 19-Mar-12 | Meeting between SHEPPARD ROBSON/AECOM/AL FARA'A/BELGIUM. BELGIUM informs again ( first information through the MOM) the Design Team that the tubular section required by specification is not available on the market. After checking by BELGIUM, only 100X50, 100X75 or 120X60 are available on the market. | BELGIUM | AECOM/ DESIGN TEAM | ACTION | ***SKETCHY*** | | **120X60X6 seems to be approved by David Ardill but not confirmed.** However, this section is not described in specification. |
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**OBJECT OF THE R.F.I.**

BELGIUM requests to the design team to clarify their position regarding the non-compliance of the steel tubular section with the specification and about the modification of the final dimension of the steel structure.

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|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information.** |

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works |
|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 |

| | |
|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-004-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Action | Date | |
| **1** | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 7-Mar-12 | Meeting between AECOM/AL FARA'A/BELGIUM. BELGIUM highlights that the design of the steel requires a pined connection between the vertical members and the brakets connected to the slab (see drawing attached). This connection will generate disturbance on the upper glass unit (important risk of breakage). BELGIUM informs AECOM that the design of the tender documents ans specifications is not workable and requires modifications. Additionnaly, BELGIUM informs AECOM that these modification are not a part of their scope and could generate overcost. MOM ... # 9 | BELGIUM | AECOM | ACTION | *NO REPLY* | | **No reply abou this issue** |
| **2** | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 19-Mar-12 | Meeting between SHEPPARD-ROBSON/ AECOM/AL FARA'A/BELGIUM. BELGIUM highlights again that the design of the steel structure is not workable. BELGIUM suggests to find a solution with David Ardill to solve this issue as already hightlights during the meeting on March 7th. | BELGIUM | AECOM/ DESIGN TEAM | ACTION | *NO ACTION* | | **David Ardill explained that this issue cannot generate overcost and/or delay for the client.** |
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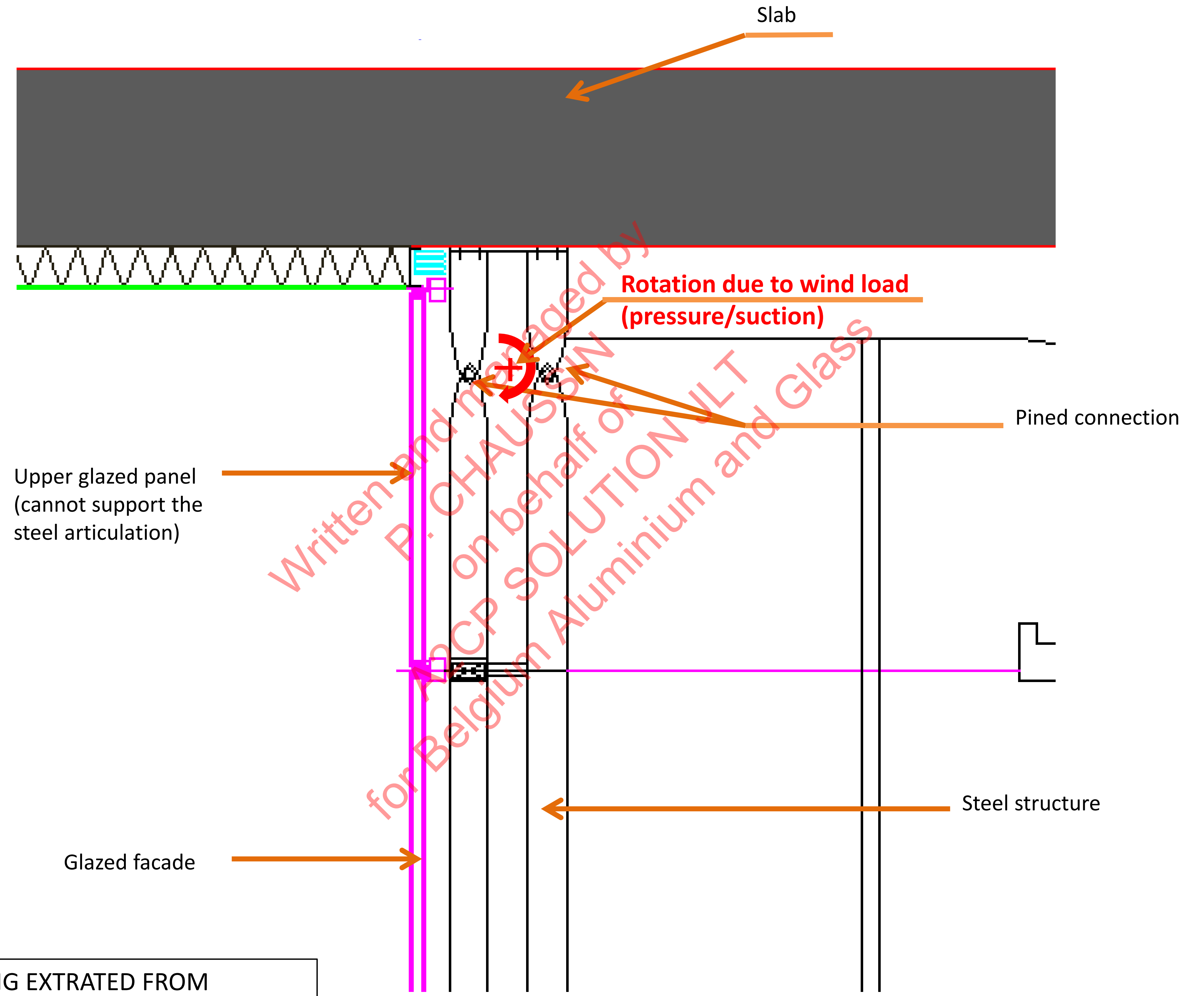
**OBJECT OF THE R.F.I.**

BELGIUM highlights on March 7th, the technical issue connected to the upper bracket of the steel structure. The design is not workable and requests modification. No reply from march 7th.
The provision to make a workable system are not in the scope of BELGIUM.
Therefore,
BELGIUM is requiring from the Design Team their position to solve this issue in compliance with specifications.

| | |
|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information. This issue is generating delay on works.** |





DRAWING EXTRATED FROM
4390_20-150 – Architectural drawings

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works | | |
|---|---|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 | | |

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|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-005-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status Action | Status Date | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 7-Mar-12 | Meeting between AECOM/AL FARA'A/BELGIUM. BELGIUM highlights that the design of the steel did not take any provision for the slab movements and loads and take only provisions for the glazed facade. This issue will transfer a compressive force on the structure which is not acceptable and should generate disturbances in the glazed facade. BELGIUM highlights that this design is not workable and requests modifications. Additionnaly, BELGIUM informs AECOM that these modification are not a part of their scope and could generate overcost. MOM recordedl | BELGIUM | AECOM | ACTION | *NO REPLY* | | **No reply abou this issue** |
| 2 | ALUMINUM WORKS | ENTRANCE CURTAIN WALL | 19-Mar-12 | Meeting between SHEPPARD-ROBSON/ AECOM/AL FARA'A/BELGIUM. BELGIUM highlights again that the design of the steel structure is not workable. BELGIUM suggests to find a solution with David Ardill to solve this issue as already hightlights during the meeting on March 7th. | BELGIUM | AECOM/ DESIGN TEAM | ACTION | *NO ACTION* | | **David Ardill explained that this issue cannot generate overcost and/or delay for the client.** |
| | | | | | | | | | | |
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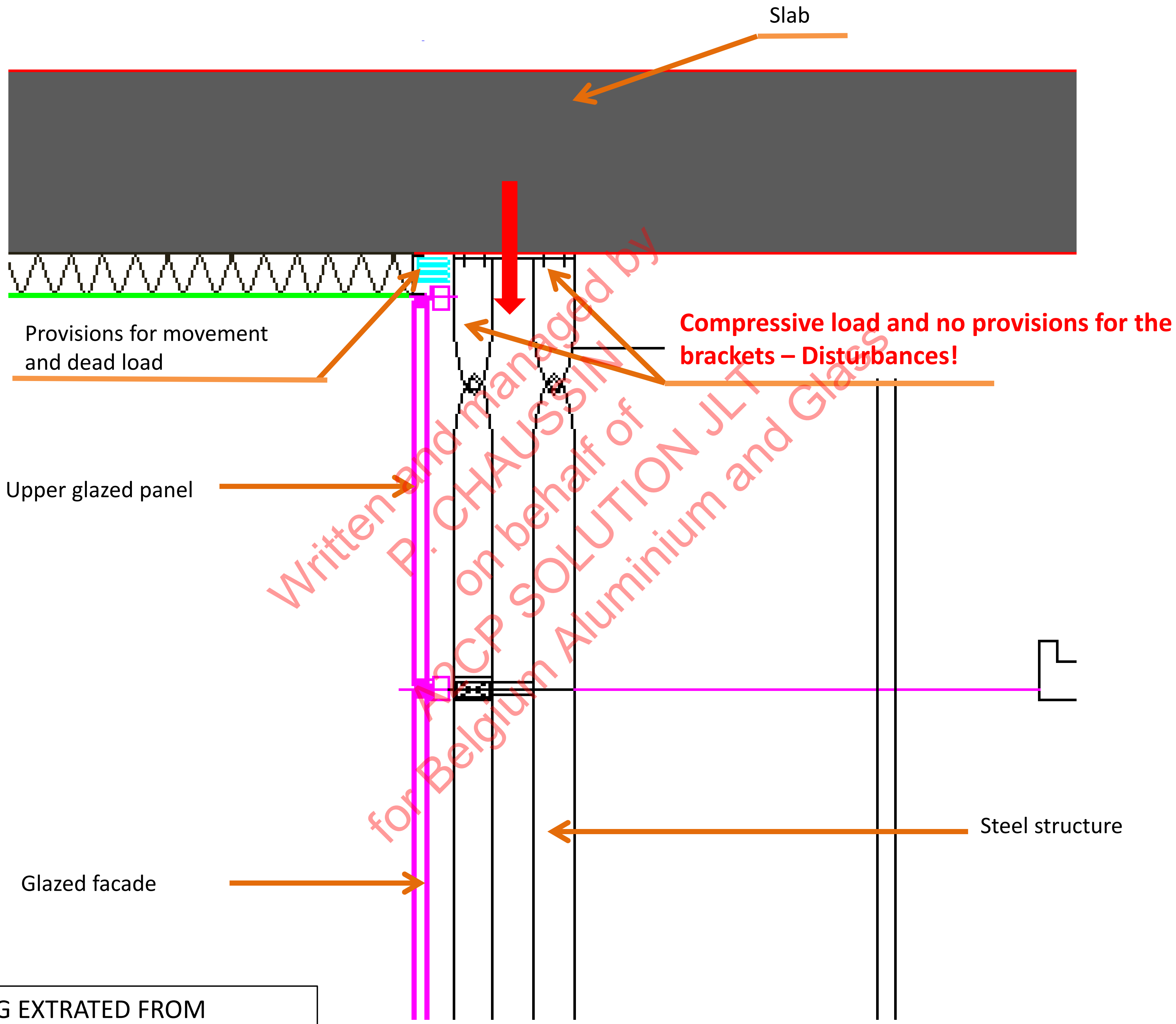
**OBJECT OF THE R.F.I.**

BELGIUM highlights on March 7th, the technical issue connected to the upper bracket of the steel structure and the steel structure. The design is not workable and requests modification. No reply from march 7th.
The provision to make a workable system are not in specification of the scope of BELGIUM
Therefore,
BELGIUM is requiring from the Design Team their position to solve this issue in compliance with specifications.

| | |
|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information. This issue is generating delay on works.** |




DRAWING EXTRATED FROM
4390_20-150 – Architectural drawings

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works |
|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 |

| | |
|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-006-0** |
| **Date:** | 3/28/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status Action | Status Date | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | ALUMINUM WORKS | RIBBON WINDOWS | 4-Mar-12 | File AFSD-CD+RB+CW-001-0PART 1 transmitted to David Ardill for comments. File submitted in the same time through PCM. | BELGIUM | SHEPPARD ROBSON | ACTION | ***SKETCHY*** | 6-Mar-12 | One mail received from David Ardill explainaning that we "seem in the right direction". Will comment later the full file. **Comments never received.** |
| **2** | ALUMINUM WORKS | RIBBON WINDOWS | 7-Mar-12 | Meeting between AECOM/AL FARA'A/BELGIUM. Ribon windows design descussed during the meeting | BELGIUM | AECOM | ACTION | ***NO ACTION*** | | **No comments from AECOM** |
| **3** | ALUMINUM WORKS | RIBBON WINDOWS | 21-Mar-12 | Meeting between SHEPPARD-ROBSON/ AECOM/AL FARA'A/BELGIUM. Ribon windows design descussed during the meeting. U-value according with the architectural design is discussed. DICOTECH, EIFS sub contractor jointed the meeting. BELGIUM hightlights that according with the design and the location of the dew point, condensation water will be trapped between the outside face of the EIFS and the wall. Substainability of the design cannot be assumed. (see drawings attached) | BELGIUM | SHEPPARD ROBSON | ACTION | ***NO ACTION*** | | David Ardill requets BELGIUM if they have any solution to solve this issue. BELGIUM confirmed that solutions are available but not according to the design and specification. The solution will not affect the architectural crieria but it is generating over cost (creation of dies) not in the scope of BELGIUM. |
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**OBJECT OF THE R.F.I.**

The dew point issue is not directly connected to the works of BELGIUM but to the design concept of the junction between RIBBON WINDOWS and EIFS.
Solution to solve this issue are available but not in the scope of BELGIUM.
Therefore,
BELGIUM is requiring from the Design Team their position to solve this issue in compliance with specifications.

| | |
|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information. This issue is generating delay on works.** |

Plotted: A2CP

Filename: 4390_21-605.dwg

ARCHITECT

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ARCHITECTURE URBAN DESIGN PLANNING INTERIORS

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LOGO

Masdar CITY مدينة مصدر

CONSULTANT

AECOM

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Siemens Headquarters Masdar City

Plot L-14b

Masdar City

Abu Dhabi U.A.E.

DRAWING NO. 4390_21-605 REV. 0

DRAWING STRIP WINDOW TYPICAL SECTION DETAILS

AMENDMENTS 2011.11.14 ISSUED FOR CONSTRUCTION

NOTE: THIS DOCUMENT HAS BEEN COMPLETED TO A LEVEL SUFFICIENT FOR INCLUSION IN THE PROCUREMENT PACKAGE CONTRACT DOCUMENTS. UNTIL SUCH TIME AS ALL LOCAL AUTHORITY APPROVALS HAVE BEEN OBTAINED AND EVIDENCE OF THE THE SAME IS AVAILABLE FROM THE CONTRACTOR THIS DOCUMENT IS SUBJECT TO REVISION. ANY RELIANCE PLACED ON THIS DOCUMENT PRIOR TO OBTAINING SUCH APPROVALS WILL BE ENTIRELY AT THE CONTRACTORS RISK

SCALE @ A3 1:02

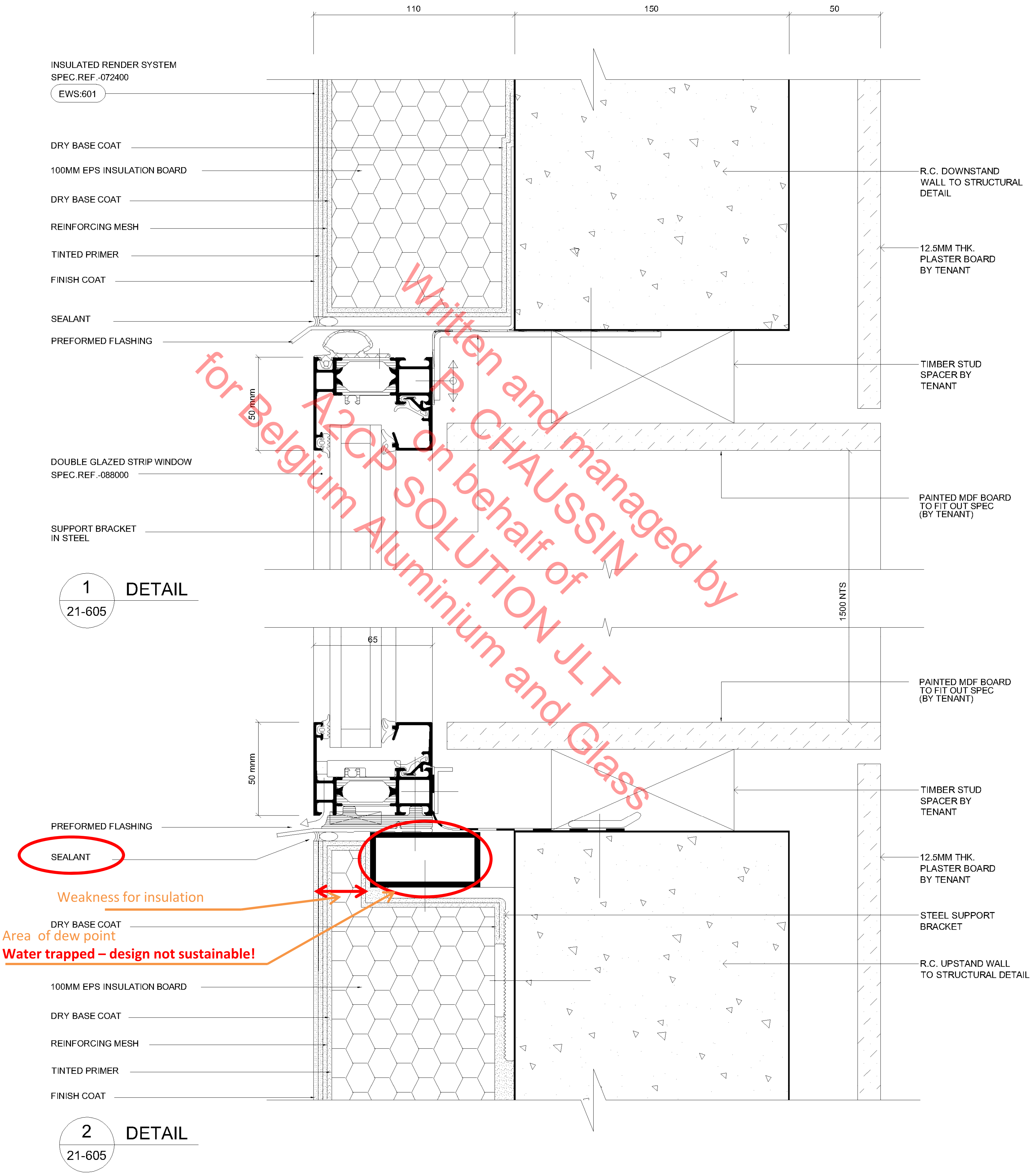
DATE 2011.07.31

ORIGINATED BY BM

CHECKED BY ET/GS

AUTHORISED BY VR/GS

STATUS ISSUED FOR CONSTRUCTION






DO NOT SCALE FROM THIS DRAWING

The contractor shall check and verify all dimensions on site and report any discrepancies in writing to Sheppard Robson before proceeding with work.

FOR ELECTRONIC DATA ISSUE

Electronic data / drawings are issued as "read only" and should not be interrogated for measurement. All dimensions and levels should be read, only from those values stated in text, on the drawing.

| Client | Project Management Company | Third Party Commissioning Agent | Main Contractor | Sub Contractor Aluminium Works |
|---|---|---|---|---|
| Masdar A MUBADALA COMPANY | MORGANTI | AECOM | AL FARA'A general contracting 1980 | BELGIUM aluminium & glass 1980 |

| | |
|---|---|
| **Project Name:** | HQ SIEMENS Masdar City |
| **Subject:** | **R.F.I.** |
| **Reference:** | **AFSD-AL-RFI-007-0** |
| **Date:** | 3/29/2012 |

| SR N° | Activity Ref | Works | Date | Request/Subject | By | To | For | Status | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Action | Date | |
| **1** | ALUMINUM WORKS | RS CLADDING | 7-Mar-12 | Metting between AECOM / AL FARA'A / BELGIUM. BELGIUM highlights that the cladding is defined as a RAIN SCREEN SYSTEM an that the necessary provisions to complete this works are not described in Tender documents and/or specifications. AECOM confirmed during the meeting that a RAIN SCREEN CLADDING is requested. BELGIUM informs AECOM that such provisions will generate an over cost. MOM recorded | BELGIUM | AECOM | ACTION | ***NO REPLY*** | 6-Mar-12 | **No comments about the meeting or the MOM** |
| **3** | ALUMINUM WORKS | RS CLADDING | 19-Mar-12 | Meeting between SHEPPARD-ROBSON/ AECOM/AL FARA'A/BELGIUM. According with the meeting of March 7th, BELGIUM explained that the system designed in not in compliance with a RAIN SCREEN CLADDING and does not provide all warantee to assume the durability of the system. M. William Whistler also highlights the risk of the design regarding the vapor barrier to respect the provision of the LEED/ESTIMADA requirements. | BELGIUM | AECOM / SHEPPARD ROBSON | ACTION | *SKETCHY* | 19-Mar-12 | **David Ardill explained that the term "RAIN SCREEN CLADDING" as per American standard was not as understood by the Design Team** and, that the name of the system was not a defining factor but that the **technical specification has priority.** |
| **4** | ALUMINUM WORKS | RS CLADDING | 21-Mar-12 | Meeting between SHEPPARD-ROBSON/ AECOM/AL FARA'A/BELGIUM. According to the meeting of March 19th, BELGIUM suggested alterations to meet the request of M. William Whistler about the continuity of the vapor barrier and to avoid any contact between two aluminium items in the stacking area (noises issues). MOM recorded | BELGIUM | SHEPPARD ROBSON | ACTION | *COMMENTED* | 28-Mar-12 | **David Ardill commented the MOM. He confirmed his position about the RAIN SCREEN CLADDING considering that the suggestion of BELGIUM is an alternative solution to the design and specification.** |
| | | | | | | | | | | |

**OBJECT OF THE R.F.I.**

The position of David Ardill about the rain Screen Cladding and his argumentation are inconsistent. They are in opossition with the specification and the relevant standards about this matter. **(Please, see the report attached)**
Therefore,
BELGIUM is requiring from the Design Team their position to solve this issue in compliance with specifications and relevant standards.

| | |
|---|---|
| **Current consequences** | **No final design/ no shop drawings are able to be achieved without these information. This issue is generating delay on works.** |

**HEAD QUARTERS SIEMENS – MASDAR CITY**
**ABU DHABI**
**ALUMINIUM WORKS – RAIN SCREEN CLADDING**

## 1. <u>Preamble:</u>

According to a first meeting on March 7th recorded by MOM, and two other meetings respectively on March 19th and 21st, BELGIUM would like to highlights the inconsistency of the design of the RAIN SCREEN and the noncompliance of this work with the relevant standards.

## 2. <u>Content of specification</u>:

### a. Works definition :

1. According to ADH-SIE-ARC-SPC-00036-0_ArchiSpec (specification) and ADH-SIE-ARC-00036-0_TRS the content of these works are described in Section 074200: Wall panels.
2. According to the below articles of the Section 074200 defining the product, the works connected to the Cladding (EWS-501) are requested as a RAIN SCREEN SYSTEM.
   i. <u>Art 2.1.B.1.:</u> *"Single skin flat panel metal wall panel rainscreen cladding system secret fixed back to cladding rails including all supports and framing as required"*
   *ii.* <u>Art 2.1.B.2.:</u> *" Rain Screen Cladding system*
      *a) The Rain Screen cladding system shall perform through either back draining and ventilation, or pressure equalization principles.*
      *b) An air gap shall be provided to the rear of the cladding panels to form a cavity to suit rainscreen principles"*
   *iii.* <u>Art 3.4.D.9</u>: *<u>"Rainscreen-Principle Installation</u>:*
      *a) Provide manufacturer's standard pressure-equalized, rainscreen-principle system with ……"*



Consequently and in opposition with the comments of David Ardill on March 28th, the works regarding the cladding (EWS501) are based on a RainScreen System.

### b. Compliance with relevant standards :

According to Section 011000 of ADH-SIE-ARC-SPC-00036-0_ArchiSpec (specification):

*i.* <u>Art 1.3.F:</u> *"The Sections of the Architectural Specification shall constitute a single document"*
*ii.* <u>Art 1.7.X.a):</u> *" The Detailed Design comply with relevant codes of practice, standards, fire regulation, safety regulations, relevant statutory rules, by laws and enforceable instruments applicable to the Design and execution of Works"*

According to Article 1.1.E-Section 074200 of ADH-SIE-ARC-SPEC-00036_ArchiSpec regarding the drawing description references:

i. *"Reference codes and accompanying descriptions are contained in the Technical Reference Sheet (TRS) and identify system/Components/ products indicated on the Tender Drawing."*

However, no reference codes and no accompanying descriptions are contained in the Technical Reference Sheets.

➡ It clearly appears that the Tender Drawings identify the system (Rain Screen Cladding mentioned) and that the detailed drawings shall comply with relevant standards.

### c. Definition of the relevant standard :

The project is under the Abu Dhabi Building Code Regulation which is directly connected to 2009 IBC.
ICC is not connected to a relevant standards regarding RainScreen Cladding (excepted issues regarding safety) and only refers on Chap 35 about some US standards or Us-Association/Organization (AAMA, ASTM, ANSI, etc….)
The following standards are internationally leading the definition and provisions for RainScreen Cladding and should be recognized as sufficient literature for the works:

AAMA : CW-RS-1-04 "The Rain Screen Principle and Pressure-Equalized Wall Design".
CWCT: "Standard for Systemised Building Envelopes".

According to AAMA, the RainScreen Principle is closely related to Pressure Equalized Design and cannot be segregated.
According to David Ardill's comments on March 28th and specification referring to "*back draining and ventilation, or pressure equalization principle –Art 2.1.B.2a)* it is acceptable to consider that AAMA-CW-RS-1-04 was not consider as a reference for the works, whenever it seems difficult to ignore this standard due to the close connection of ICC to the US standards and the connection to the wind load calculation (ASCE 7-05)
However and according to the previous elements, the Rain Screen Cladding works should be minimum in compliance with the "Standard for Systemised Building Envelopes" edited by CWCT (however the wind load definition is not applicable)



## 3. <u>RainScreen cladding – Compliance with CWCT standard</u>:

According to CWCT definition regarding the ventilation of RainScreen, the design shall comply with the following:

Art 3.4.4.1: *"All RainScreen cavities shall be ventilated …."*
Art 3.4.4.2: "*All cavities with openings to the exterior shall be adequately ventilated. The position of joints and vents shall be coordinated with compartments and closers"*
*Art 1.3.2.8: "Cavity Closer: A barrier that acts to compartment the cavity as described 1.3.2.12. To achieve pressure equalization cavity closers do not have to create a complete air seal, but must offer sufficient resistance to the flow of air between compartments"*
*Art 1.3.2.12: "Compartmentation: The provision of cavity closers to form discrete compartments within the cavity. Compartmentation is necessary to:*

a) *Prevent gross air movement through cavities at corner, parapets and similar areas where wind pressure varies across the surface…."*

b) *Achieve pressure equalization (if required)"*

Additionally and according to CWCT provisions, to comply with the conditions for pressure-equalization the design shall comply with the following:

*Art 2.2.6: The air permeability of the RainScreen is greater than ten times the air permeability of the air barrier and,*
*Each compartment is vented with openings of adequate area for the volume of the compartment, and,*
*The cavity is compartment as follow:*

1. *By a horizontal cavity closer at each floor level, and*
2. *By a horizontal cavity closer within 1,5m of parapet, and*
3. *By vertical cavity closers at no more than 6.àm centers, and*
4. *By vertical cavity closers at no more than 1,5m center within 6.àm of a corner and,*
5. *By a closer as near as is practical and not normally more than 3àà mm from the finished outer corner."*

Additionally, the same article requests the following provisions:

*"Detailed calculation may show that pressure-equalization can be achieved with larger compartments or smaller openings".*

It clearly appears that the Tender Drawings are not in compliance with the disposition provided by CWCT either back-drained system or pressure-equalization system (no provision for closers/compartmentation) and, therefore it is not possible to achieve the detailed drawings in accordance both with the Design and the relevant standard;