

THE EFFECT OF HORIZONTAL IRREGULARITIES AND BASE ISOLATION
CONFIGURATION ON SEISMIC RESPONSE OF RC BUILDINGS

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ABSTRACT

THE EFFECT OF HORIZONTAL IRREGULARITIES AND BASE ISOLATION CONFIGURATION ON SEISMIC RESPONSE OF RC BUILDINGS

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This study aims to evaluate the effect of horizontal irregularities and base isolation configuration on the seismic response of reinforced concrete base-isolated buildings. A set of structural models with varying re-entrant corner geometric properties has been utilized to make evaluations with respect to square-symmetric ordinary form. In addition to this set, alternative models with non-uniform mass distributions in the plan have also been employed to expand the building set. Elastic response spectrum-based analyses have been performed to design the seismic isolation systems of the selected buildings with an iterative procedure considering the same target period and displacement. After finalizing the design stage, strong ground motion record suites compatible with three different target spectra have been compiled and utilized to perform nonlinear time history analyses. The numerical results of these analyses have been processed to display and assess the effects of horizontal irregularity and mass concentration on selected fundamental engineering demand parameters. It has been shown that as the level of irregularity increases, the fundamental engineering demand parameters –monitored in the irregularity direction- tend to increase as well,

whereas this trend is not clear in the symmetry direction. Worsening site characteristics reflected via the target spectra and compatible ground motion records tend to amplify the responses. In addition to horizontal irregularity and mass concentration, the isolator configuration, which is deemed to have crucial interaction with horizontal irregularity effects, has been also examined for a specific building case selected from the main set. Alternative isolator schemes have been considered to reveal the group effect on the selected engineering demand parameters. The general conclusion of this study is that the base isolation system significantly reduces the adverse effects of irregularity on seismic response of the buildings, as apparently observed in fixed-base structural systems, yet it cannot completely eliminate them, especially at the roof level of the buildings.

Keywords: Horizontal Irregularity, Mass Irregularity, Seismic Isolator, Seismic Isolator Configuration, Seismic Response

ÖZ

YATAY DÜZENSİZLİKLERİN VE İZOLATÖR KONFIGÜRASYONUNUN TABAN YALITIMLI BETONARME BİNALARIN DEPREM DAVRANIŞINA ETKİSİ

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Bu çalışma, yatay düzensizliklerin ve izolatör konfigürasyonunun deprem yalıtımlı betonarme binaların deprem davranışına etkisini incelemeyi amaçlamaktadır. Deprem davranışlarının değişimini incelemek için, girintili ve değişken geometrik özelliklere sahip bina model setleri hazırlanarak, kare-simetrik basit formdaki bir bina ile karşılaştırıldı. Yapı setini genişletmek amacıyla, planda homojen olmayan kütle dağılımına sahip alternatif ilave modeller oluşturuldu. Seçilen binalarda aynı hedef periyod ve deplasman değeri için izolatör sisteminin iteratif tasarımında elastik tepki spektrum analizi uygulandı. İzolatör tasarımının tamamlanmasının ardından 3 ayrı hedef spektruma uygun yer hareketi kaydı seçilerek tüm yapılarda zaman tanım alanında doğrusal olmayan analiz uygulandı. Yatay geometrik düzensizlik ve kütle düzensizliği etkilerini ortaya çıkarmak amacıyla sonuç setleri hazırlandı ve seçilen temel mühendislik talep parametreleri üzerinden karşılaştırmalı olarak incelendi. Düzensizlik seviyesinin artışının -düzensizlik yönünde- temel mühendislik parametrelerinde artış eğilimi yarattığı ancak bu artış eğiliminin simetri

aksında net olmadığı gösterildi.Kötüleşen zemin özellikleri, hedef spektrum ve uyumlu yer hareketi kaydı vasıtasıyla deprem tepkilerini artırma eğilimindedir.

Ayrıca, yatay düzensizlik ve kütle konsantrasyonuna ek olarak, yatay düzensizlik etkileriyle önemli etkileşime sahip olan izolatör konfigürasyonu, ana bina seti içerisinde seçilen belirli bir bina için incelendi. Grup etkisini ortaya çıkarmak amacıyla oluşturulan alternatif izolatör şemalarının seçilen mühendislik parametreleri üzerindeki etkisi incelendi. Bu çalışmanın genel sonucu; taban yalıtımı sistemi, düzensizliğin binaların sismik davranışı üzerindeki olumsuz etkilerini ankastre temelli bir sisteme göre önemli ölçüde azaltmakta, ancak yapının özellikle çatı katı seviyesinde bu etkileri tamamen ortadan kaldıramamaktadır.

Anahtar Kelimeler: Yatay Düzensizlik, Kütle Düzensizliği, Deprem İzolatörü, Deprem İzolatör Konfigürasyonu, Deprem Davranışı

To Alin...

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LIST OF ABBREVIATIONS

ABBREVIATIONS

ASCE	American Society of Civil Engineers, Minimum Design Loads and Associated Criteria for Buildings and Other Structures
A	Cross-sectional area
BSR	Base Shear Ratio
D	Specified design displacement
DBE	Design based earthquake
DD	Displacement corresponding to the design based earthquake
DM	Displacement corresponding to maximum capable earthquake
D_y	Yield displacement
G	Shear modulus of the elastomer
GM	Ground motion
g	Acceleration of gravity
IDR	Interstory drift ratio
KH	Horizontal stiffness of bearing
KV	Vertical stiffness of bearing
K1	Elastic stiffness
K2	Post elastic stiffness
k_{eff}	Effective stiffness
MCE	Maximum credible earthquake

MPR	Mass participation ratio
Q	Characteristic stiffness
P_{cr}	Buckling load
PEER	Pacific Earthquake Engineering Research Center
NGA	Next Generation Attenuation
PFA	Peak floor acceleration
RDR	Roof drift ratio
T_D	Isolated period at design displacement
T_M	Isolated period at maximum displacement
TBEC	Turkish Building Earthquake Code
T_{eff}	Effective period
V_s	Base shear force
W	Seismic weight of structure

LIST OF SYMBOLS

SYMBOLS

β	Damping ratio
β_{eff}	Effective viscous damping ratio
γ_{max}	Maximum shear strain

CHAPTER 1

INTRODUCTION

Architectural requirements usually result in irregularity or asymmetry in buildings to provide a functional design. In such circumstances, having at least one type of irregularity generally leads to high seismic demands in various parts of the structural system of the building. Eventually, building codes attempt to prevent these phenomena. As an alternative way of reducing seismic risk, structural engineers prefer to use seismic base isolation. Correspondingly, using base isolation system in an irregular building extends the “safe design” margins regarding its seismic response.

1.1 Base Isolation Concept and Background

Because earthquakes are inevitable and beyond our control, we should ensure that capacity exceeds demand for the structures. Seismic inertia forces are directly correlated with the mass of the building and seismic intensity. And seismic resistance of the building depends on the strength of members and structural configuration. To meet the increasing seismic demand, the seismic resistance of the structure should be increased. To prevent structural damage under seismic actions, sufficient lateral structural strength should be provided.

But the strength of the building cannot be increased infinitely. To meet the seismic demand, ductility is the most important tool for engineers. Ductility, used in the scope of earthquake engineering can be defined as letting the structural elements deform beyond their elastic limits controllably (T. E. Kelly, 2001).

Within the elastic limits, the effect of load on the member is non-permanent, yet once the elastic limit is exceeded load creates irreversible and permanent changes. A

design strategy focused on capacity encounters with two main critical approaches: The first path is further increasing the elastic strength which is costly and creates higher story accelerations at buildings. This is also more vulnerable to the contents of the building designed with less strength. For the second approach, the elastic strength of the building is limited, and the ductility of the building increase with proper detailing. But it is accepted that, under strong ground motions, unreparable structural and non-structural member damage will occur.

Another strategy for solving the “design problem” is reducing the demand instead of increasing the capacity which is called “Base Isolation”. Seismic actions cannot be controllable but the seismic demand can be adjustable. This is achieved by preventing the transmission of the ground motions into the superstructure. In base isolated buildings, damage in devices and equipment is prevented. Base isolation is preferred at high earthquake risk areas for the protection of the hospital devices that need to be used after an earthquake and are sensitive to movements, historical monuments stored in museums that cannot be rebuilt, nuclear reactor which can cause major disasters after an earthquake, sensitive devices in R&D centers. With this approach, the production losses in the industry can be avoided. It should be noted that the cost of production losses was quite high as a result of the earthquake that occurred on 17.08.1999 in the Marmara region Turkey where the most important industrial facilities of the country were located. After the earthquake, partial or complete destruction of the production facilities or the damage to the devices within these facilities were commonly observed.

Seismic isolation systems can be used in a new building and also can be easily used to strengthen the existing buildings. There is no need for any invasion activity on the upper floors of the structure during strengthening with seismic isolation systems. Thus, the strengthening of the superstructure can be completed without disrupting the architecture and emptying the upper floors. Especially in the retrofit of historical buildings, these systems provide a great advantage. Since these devices can be dismantled and reassembled, they do not shorten the life of the structure. It is also

noted that soft soil does not have an advantage for base isolation system. Since the period of the building is close to the ground period, the seismic demand of the structure will increase. This will eliminate the advantage of the base isolated system according to the fixed based system.

1.2 Irregularity Concept

In real life, the regular idealized building seems rare for engineers. There are many irregularity types in the real buildings and also sometimes it can be difficult to recognize in every aspect. Architects usually prefer to design irregular buildings. This generally requires due to providing building ventilation, proper light in areas and functional design of areas with effective interaction. Also usually, during the utilization, building mass does not have the homogenous distribution due to the usage purpose of the building areas. For the structural design, earthquake codes define the irregularity in two main cases; plan and elevation. But, the combination of different types of irregularity has been observed in the real building. Seismic demands of irregular buildings. (ASCE/SEI 7-22, 2021) C12.3 irregularity classifications are given below:

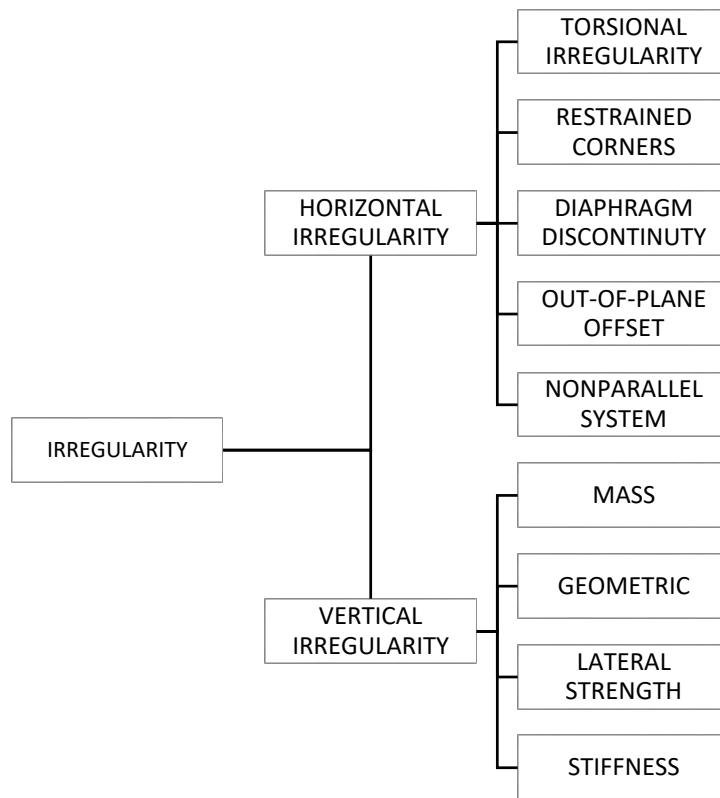


Figure 1.1. Irregularity classification chart ASCE/SEI 7.22 C12.3

1.2.1 Horizontal Irregularity

Horizontal irregularity is a deficiency on the horizontal structural system employed the lateral force distribution to the vertical structural system. Horizontal irregularity types are classified as torsional irregularity, restraint corner irregularity, diaphragm discontinuity, out-of-plane offset, non-parallel system. Examples of horizontal irregularity defined in ASCE/SEI 7.22 C12.3.2.1 has been provided in Figure 1.2.

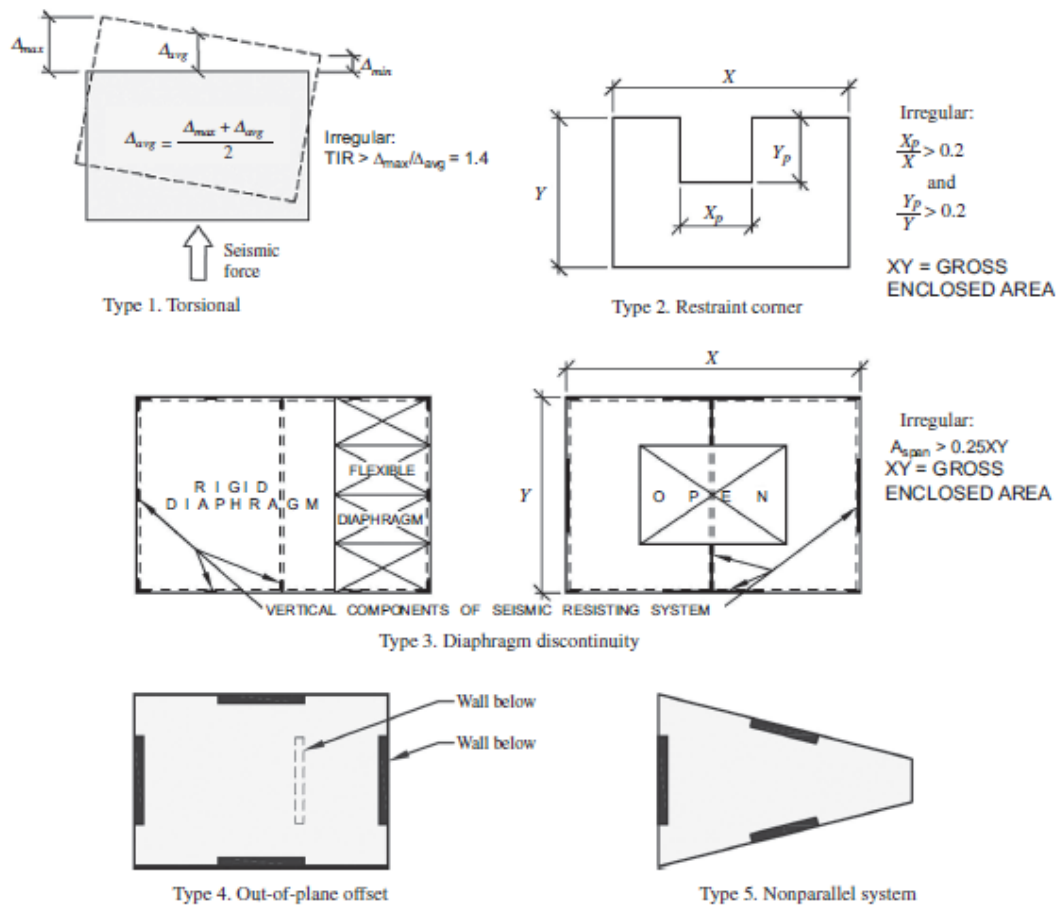


Figure 1.2. Horizontal irregularity in ASCE/SEI 7.22 C12.3-1b

The buildings with reentrant corner irregularity in plan, demonstrate the undesirable vibrations and stress concentration under seismic actions. The ends of the building behave much more flexibly according to the center of rigidity. On the other hand, structural demand of excessive deformations of the flexible ends of structure results in high stress concentration on the central parts of the building. The wings of these buildings behave differently from the whole building under seismic actions. This response difference creates high local stresses. Seismic response of reentrant corner building is demonstrated schematically in Figure 1.3.

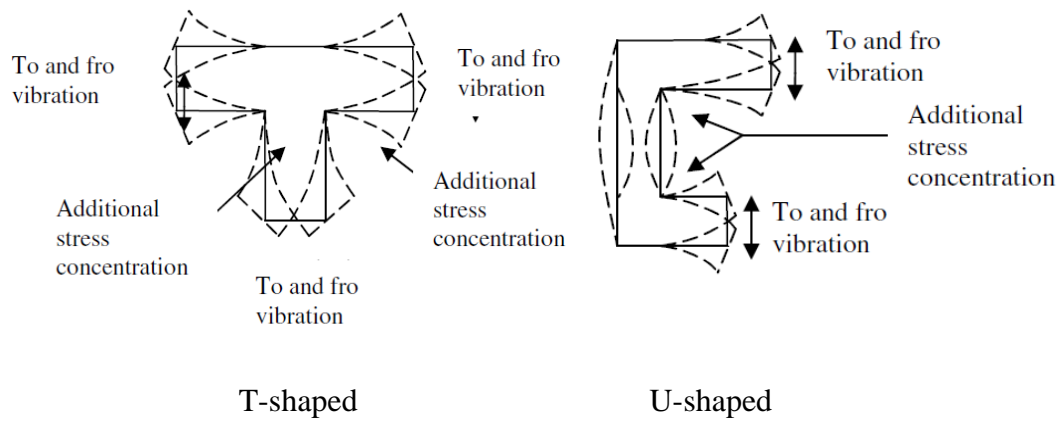


Figure 1.3. Seismic response of restraint corner irregular structure

Most of the building codes and provisions for designing buildings possess high reentrant corner irregularity over the code limitation, suggesting the building is separated into two different parts with simple geometry as displayed in Figure 1.4. A complex shape building should be cut off regarding wings geometry with dilatation to create regular shape structures. Therefore, severe seismic responses can prevent the fixed base structures. Using a base isolation system for this characterized structure significantly decreases unfavorable results under seismic actions without using dilatation.

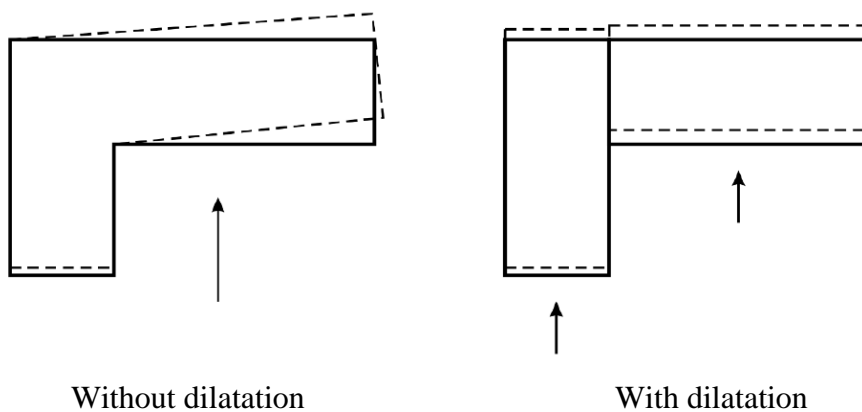


Figure 1.4. Seismic response of L-shaped building with/without dilatation

1.2.2 Vertical Irregularity

Vertical irregularity is a deficiency on the vertical structural system employed the transmit lateral force between the stories until the foundation system. Vertical irregularity has been classified as soft-story irregularity, mass irregularity, vertical geometric irregularity, in-plane discontinuity, lateral strength (weak story) irregularity. Examples of vertical irregularity defined in ASCE/SEI 7.22 C12.3.2.2 have been provided in Figure 1.5.

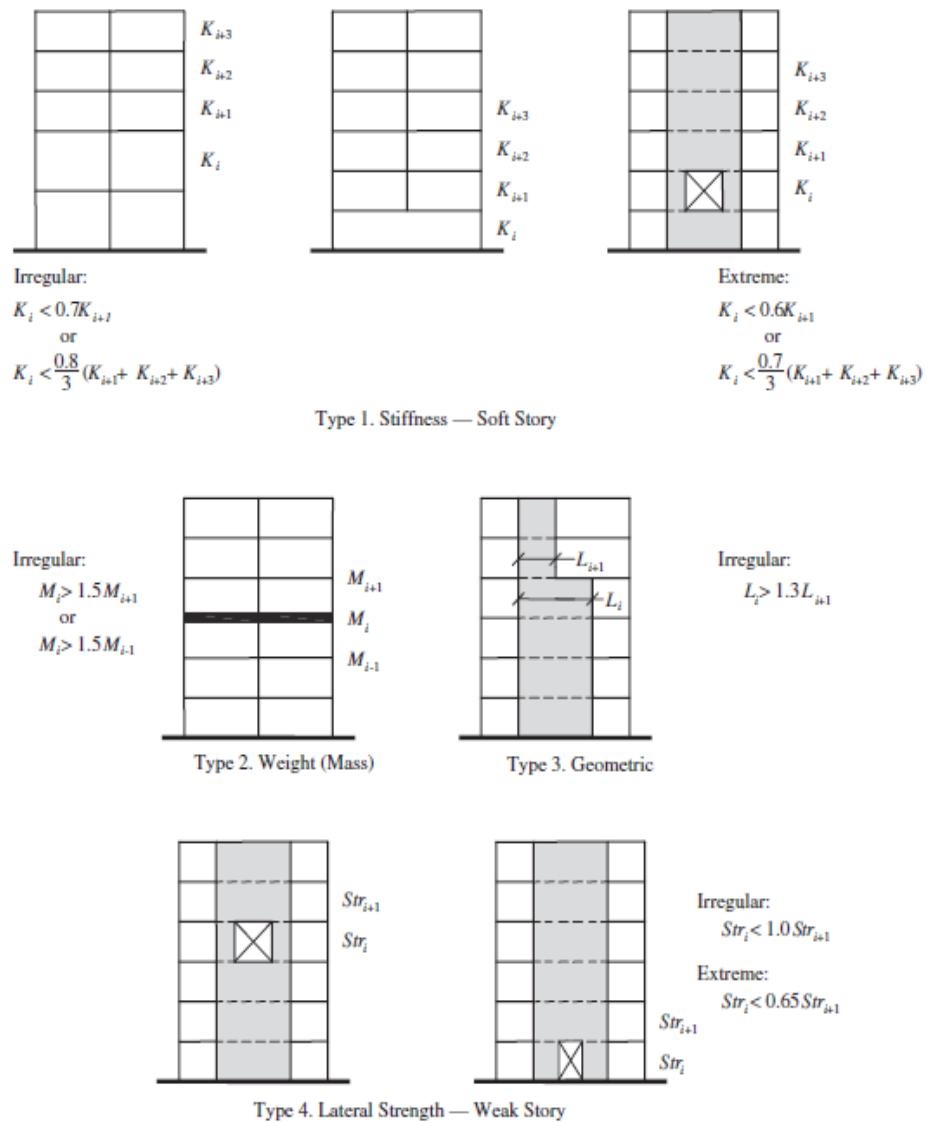


Figure 1.5. Vertical Irregularity in ASCE/SEI 7.22 C12.3-2

In the past earthquakes, buildings have irregular configurations due to asymmetric mass patterns, stiffness and strength suffer from severe damages or unpredictable collapse of the structure. Because inelastic behavior occurs in the irregular building concentrated on the certain parts that lead to rapid damage in these members of the structure under the effect of irregularity. Therefore, elastic analysis methods are not sufficient due to the inelastic demand of these structures under seismic actions. Because of the code provisions generated considering regular and idealized structures, do not let the gross irregularity under high seismic effect may cause high inelastic demand in the structure. In conjunction with the aim of the thesis study, only plan irregularities in these standards are inspected and topics about vertical irregularities are kept out of scope.

1.3 Irregularity and Base Isolation Concept

The studies done so far in the area of seismic base isolation have proven that this system is effective in protecting certain types of structures with irregularity during an earthquake. R&D studies on rubber bearings and dampers have helped to reduce the costs recently and these systems have ended up being a good option for constructing the buildings in seismic zones, including regular multi-story buildings like offices, residential housing and industrial buildings.

It is known that the priorities of architecture and earthquake engineering do not coincide. Architecture usually favors complex irregular buildings which are often asymmetrical in plan, which results in an irregular structural form. At this point, using the base isolation systems considering the structural rules and limitations create a substantial contribution in reducing the hazardous torsional effects in irregular structures and enhancing structural safety. Base isolation diminishes the inelastic response of the irregular structures. Therefore, this type of structure can be designed as elastic procedure safely. Also, the base isolation system creates the drastic reduction of structural torques and shear forces and plan asymmetric structure can be designed with minimum seismic penalties due to torsional imbalance. The

graphic given below in Figure 1.6 presents the statistics on the literature about asymmetric/irregular structures (Das et al., 2021).

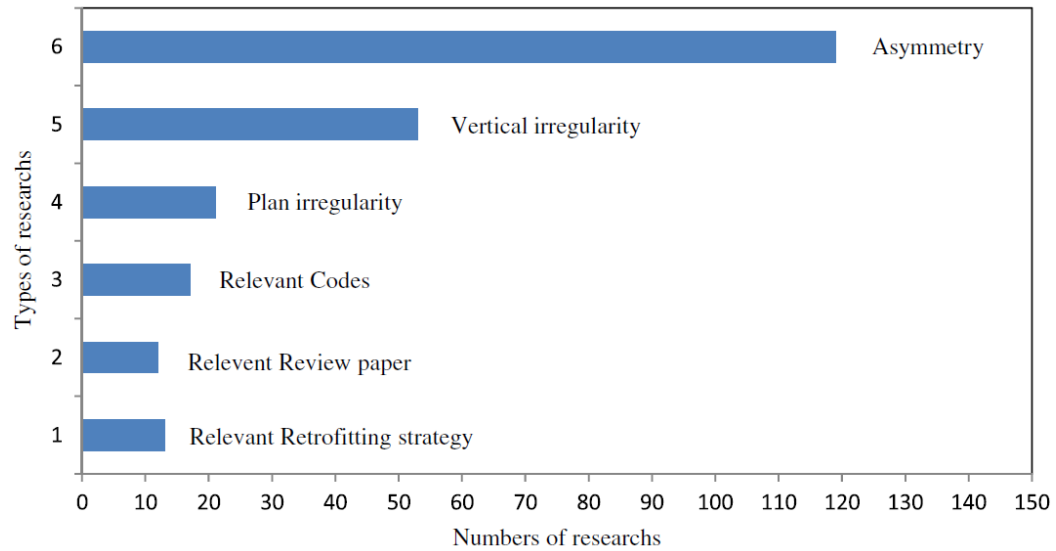


Figure 1.6. Research on asymmetric/irregular structures (Das et al., 2021)

The maximum number of papers are presented about plan asymmetry. Different types of irregularity have less research compared to asymmetry topics. Code and regulations of various countries included brief discussion and limitations about irregular structures. Recent studies about the irregularity effect on seismic responses of with/without base isolated structures have been presented in Chapter 2.2.

1.4 Seismic Evaluation Approaches

Earthquake is a dynamic phenomenon where ground movements result in load change over time. It is unclear whether each earthquake event will generate different ground movements and these movements will then be altered by the characteristics of the ground on which they travel. The codes aim to use the minimum number of loading for sake of simplicity. Seismic loads are classified in three main forms, with a stepwise increase in complexity.

- Equivalent static loads.
- Linear response spectrum analysis.
- Linear Time History Analysis.
- Nonlinear Time History Analysis.

1.4.1 Equivalent Static Loads

This loading type is generated as a function of structural period, soil type, seismic zone factor and applied to the structure linearly with height. The equivalent static load is the envelope of the story shears. The structure with base isolation has dynamic behavior and damping is also included. Therefore, due to its limitations, most codes limit the usage of this static loading procedure.

1.4.2 Response Spectrum

Response spectra can be defined as an envelope of various earthquakes for a specific site in terms of soil type and seismic zone in the codes. Code base spectrum does not show a single event. Spectrum has the all seismic contributions for a site. Response spectrum analysis does not directly apply for base isolated structures due to the uncoupling modes working only for the linear elastic structures. Compared to the equivalent static loading method, the response spectrum has more acceptance for many design codes. In a real design procedure, base isolation system is defined as an equivalent elastic system, damping is applied using a damped response spectrum for isolation modes. But recent researches show that equivalent elastic system with damped response spectra may underestimate the story acceleration and overturning effects for nonlinear systems. It is recommended that elastic response spectrum method should not be suggested for using the final design. In the scope of this thesis, response spectrum analysis has been performed for the iterative LRB system design.

1.4.3 Response History

Response history analysis is the most accurate method for reflecting the seismic forces imparted on the structure under the effect of strong ground motions. Acceleration time histories had been recorded from past earthquakes and these data have been stored and made publicly available by ground motion database like PEER NGA. Each site and project require special appropriate records for representing the possible form of seismic acceleration. To determine the seismic response of base isolated structures, response history analysis is generally preferred. In the scope of this comparative study, all model sets have been evaluated under nonlinear response history analysis. Ground motion record sets have been collected from PEER NGA database. Another point is, this study does not aim to design the building or the isolation system. The main objective target only the monitoring of the structural responses with changes in the building and isolator system.

1.5 Aim and Scope

This study aims to evaluate the variation in seismic response of horizontally irregular reinforced concrete base isolated buildings commonly used around the world. A set of structural models with varying re-entrant corner geometric properties has been utilized to observe the change in seismic demands concerning square symmetric ordinary form. In addition to this set, alternative models with non-homogenous mass distributions in the plan have also been employed to expand the building set. Also, the grouping of isolators has been studied for a specific case. Different number of isolator groups have been employed for the constitution of the base isolation system considering the variation of vertical load.

In this scope, nonlinear response history analyses have been performed and fundamental engineering demand parameters have been recorded from the 14 different structural models. Ground motion sets are prepared considering three site classes as Site Class A, Site Class C and Site Class D based on ASCE 7.22

classification. For each site class, 11 sets of 3-components records are utilized. The result set has been comparatively studied to reveal the effect of horizontal irregularity in seismic response. Alternative isolator schemes, that is deemed to have crucial interaction with horizontal irregularity effects, have been also examined for a specific building selected from the main building set to observe the group effect on the selected engineering demand parameters.

The results of these studies have been summarized as the base isolation system significantly reduces the irregularity effect on seismic response of buildings according to fixed-based system but not completely overcome the irregularity deficiencies especially at the roof level of the building.

1.6 Motivation to Thesis

In recent years, especially after the Ministry of Health's policy changed in 2013, hospital buildings should be designed with base isolated system (Çabuk et al., 2020). But these buildings generally have irregular characteristics due to architectural design requirements. Isparta City Hospital Building 3D and plan visuals are presented in Figure 1.7 and Figure 1.8. The structural designers prefer the separate the irregular formed buildings into regular shaped ones. But base isolation systems significantly reduce the severe effect of seismic responses. Therefore, the structures with high irregularity can be designed by utilizing base isolation system This study aims to determine the relationship between the irregularity and seismic response of the buildings and presents the observations to support the design approach.



Figure 1.7. Isparta City Hospital 3D View (Çabuk et al., 2020)



Figure 1.8. Isparta City Hospital Plan View (Çabuk et al., 2020)

1.7 Organization of the Thesis

This thesis is composed of 6 main chapters. Chapter 1 presents an introduction to the main concepts which are the base isolation, irregularity and combination of these two concepts. In addition, seismic evaluation approaches, aim and scope, motivation to thesis and thesis organization are provided in this chapter.

Chapter 2 reviews background survey about the emerging base isolation technology and the recent research about the irregular and/or base isolated structures.

In Chapter 3, the modeling and analysis techniques, the model sets and fundamental parameters utilized in the modeling procedure have been described.

Chapter 4 introduces the methodology for the basis of the thesis as a comparative study. Detailed seismic input such as response spectrum parameters, strong ground motion record sets, LRB design procedure and the detailed description and calculation methods of fundamental engineering parameters are utilized as a discussion tool provided in this chapter.

Chapter 5 discusses the results for all model sets and all site classes. Each model set such as T-shaped, U-shaped, mass concentrated and isolator group effect are evaluated under different subcategories.

Chapter 6 concludes the study with concluding remarks from Chapter 5 discussions.

CHAPTER 2

LITERATURE REVIEW

Emerging of base isolation technology in structures around 1960s and the development of the field since then has yielded several studies in the earthquake engineering area. Key references related to this field from 1980's have been summarized in Chapter 2.1. In recent years, the popularity of base isolation concept in the research community has extended to the comprehensive evaluation of specific cases such as asymmetric and/or irregular buildings, near-fault effects etc. The focus of this study seismic response of base isolated structures possessing plan irregularity. Fundamental researches conducted on this field are presented in Chapter 2.2.

2.1 Studies on Base Isolation System

J. M. Kelly & Hodder (1982) performed various experiments to determine the effect of base isolation on the seismic response of secondary equipment placed inside the structure. These experiments were conducted using four seismic records on a large-scale 5-story building model mounted on a shaking table. Kelly examined the model with five different isolator types under seismic actions. Pendulums were used as secondary equipment within the structure. As a result, it has been proven that the base isolation systems significantly reduce the seismic response of secondary equipment within the structure. In terms of applicability, two types of bearing have been proposed: a system in which the low-friction bearing consisting of Teflon and stainless steel is used with rubber systems and a lead core rubber bearing model. Mostagel & Kelly (1987) provided design procedures for elastic friction base isolation systems (R-FBI).

In the study of Zayas et al. (1990), the properties of frictional pendulum systems were experimentally demonstrated. Researchers experimentally prove that frictional pendulum systems increase the period and reduce the seismic actions of the structure. In addition, frictional pendulum bearings have been proven to absorb seismic energy, reduce displacement at the isolation level and interstory drifts of the superstructure.

Aiken et al. (1992) conducted a series of experimental studies to determine the mechanical characteristics of three types of seismic isolation systems with different rubber properties. The result of the experiments proves that changes in vertical loading and loading frequencies did not significantly affect the shear rigidity and damping ratio characteristics of the bearings. In the shear strength tests, it was determined that the bearings lasted up to 500% shear shape changes. Tensile strength tests have shown that bolted high damping rubber bearings are resistant to high levels of stress. Higashino & Okamoto (2006) give an overall view of the usage of base isolation in different countries, regulations, design and construction details and information about various special projects. Kikuchi & Aiken (1997) designed an analytical hysterical model for elastomeric isolation bearings to calculate the seismic response of base-isolated structures with minimal errors. Shaking table tests were carried out on the building model mounted on four different elastomeric bearings and it was observed that the results obtained from these tests were very close to the values calculated analytically using the mechanical characteristics of the bearings.

Naeim & Kelly M. James (1999) gave the theoretical principles of a linear model consisting of dampers added to the system to reduce the displacement of the isolation system. It can be said that the seismic isolation approach was first formally brought in. Until now, it has gained tremendous acceptance globally for being an applicable approach to avoid the damage that occurs at buildings and bridges under seismic excitations.

2.2 Recent Studies on Irregular Buildings with Base Isolation System

A comprehensive review of structural irregularities and systematized of conducted researches up to 2001 is provided in Rutenberg (2002). Another comprehensive study presents the research developments on the seismic response of plan and vertically irregular buildings between 2002 and 2006 (De Stefano & Pintucchi, 2007). They focused on three main research areas. First is, the effects of plan irregularity, second is mitigating the torsional effect utilizing the passive control systems. The third research area is the vertically irregular building. The authors state that there is a significant improvement in behavioral and design-oriented clarification of the issues. After this study, research activity on the seismic response of irregular buildings and base isolation has been increased.

Tena Colunga & Zambrana Rojas (2006) presents a parametric study where the torsional response of base-isolated structures with various base isolation eccentricities. Peak responses are studied for different static eccentricity ratios between the center of rigidity and center of mass of the isolation system utilizing the nonlinear dynamic analysis. Reasonable limits are provided for static eccentricities to define base-isolated structures having torsional irregularity. As an extension of this work, eccentricity is set on the superstructure. Nonlinear dynamic analysis is performed for the structures with various eccentricities between the center of stiffness and the center of mass on the superstructure. The authors declare reasonable limits for the base-isolated irregular structures considering eccentricities in the superstructure, regarding the range of periods. The torsional plan eccentricities for stories, shall not exceed 10% of the plan dimension in the given direction of analysis. In addition, when the torsional plan eccentricities exceed 20% of the plan dimension in the given direction of analysis, the structure can be identified as strong torsional irregular (Tena-Colunga, 2021; Tena-Colunga & Escamilla-Cruz, 2007).

Kilar & Koren (2009) conducted important research on “Seismic behavior of asymmetric base-isolated structures with various distributions of isolators”. The set of four-stories RC buildings with LRB base isolation systems were modeled.

Asymmetric building set was produced by changing the center of mass and mass distribution but the total mass of the building is still the same. Also, the isolation system has various types according to the isolator center position concerning the superstructure mass center. Uniform, peripheral, and four asymmetric isolator distributions were employed. The results showed that the base isolation system considerably reduce the torsional responses. In accordance with the general opinion; coincidence with the center of isolation and center of mass is the most preferable approach to mitigate the torsional effect in the isolation system. On the other hand, researchers declared a new observation that nonlinear behavior of the superstructure shows that damages occur in the flexible side of the building.

Kilar et al. (2011) declare another research about the nonlinear response of the fixed base and base isolated asymmetric variants of the existing high-rack steel structure, with different mass eccentricities. Nonlinear static analyses (i.e. the extended N2 method) are utilized and results are compared with the nonlinear dynamic analyses. They conclude that the maximum eccentricity occurs when the payload mass distribution is placed on only one side of the floor plan at lower occupancy level. Asymmetry increases the damage in the supporting structure on the flexible side, and only when the eccentricity is small, the central part of the rack structure remains in the elastic region. Also, full occupancy is not the most critical case for seismic response. But the lower occupancy level, which could create eccentricities up to 10% or 15% of the larger floor plan dimension; can cause damage propagation in some columns. Also, the accidental eccentricity as 5% of the floor plan dimension, might be not sufficient for an unfavorable asymmetric payload distribution. As another remark is the base isolation system creates a much better seismic response since it eliminates all damages to the rack structure and also to the supporting structures.

Seguin et al. (2008) investigated the linear earthquake response of asymmetric seismically isolated structures and they offered a closed equation to develop a simplified procedure to estimate the amplification of edge displacements of the superstructure and base isolation. Another important observation is that adjusting the isolated base parameters can be an effective tool to control the torsional response of

the superstructure without causing an imbalance of the edge deformations of the base. Seguin et al. (2013) present research about the torsional balance of seismically isolated asymmetric structures that continue from the investigation of the (Kilar & Koren, 2009) on the damage of flexible side frames of the superstructure. They declared that analytical and experimental investigations show the seismic isolation system manages the translation of the structure under seismic excitation. They provide an “optimal torsional control” methodology. The main idea is that the isolation and superstructure systems can be considered as two separate parts created by the filtered seismic action produced by the base response. It is necessary to set optimal eccentricity and torsional stiffness parameters in the isolation system to create counter-balance torsional effects in base isolated asymmetric superstructures. After the comprehensive analyses, the authors declare that the isolation system should be torsionally flexible, and the center of stiffness of the base isolation system should lie near the average center of stiffness of the superstructure is required to obtain an improved lateral-torsional seismic response.

Another research was conducted about torsion in base-isolated structures affected by two horizontal components of earthquake simultaneously. The investigation was performed under various principal parameters as having the different number of stories, the various ratio of uncoupled torsional frequency to lateral frequency in the superstructure and isolation system and various mass eccentricity with different directions in the superstructure and the isolation system. The authors conclude that the distance of mass and stiffness centers of the superstructure is more effective on the location of the total center of the structure. The ratio of uncoupled torsional frequency to lateral frequency of isolation system is an essential parameter for all considered parameters. The ratio of uncoupled torsional frequency to lateral frequency of superstructure has no significant effect on the parameters related to structural period such as base shear but it affects the ratio of the last floor to base foundation rotation. The assumption for rigid superstructures is not valid and eccentricity effects on superstructures should be considered. The use of rigid superstructures and calculation of dynamic torsion by multiplying eccentricity by the

dynamic base shear is unacceptable assumptions. In addition, increasing the ratio of uncoupled torsional frequency to lateral frequency of isolation system increases the torsional stiffness of the isolation system and causes the torsional behavior of the structure closed to a fixed base one (Khoshnoudian & Azad, 2011).

Cancellara & De Angelis (2012) evaluated the seismic responses of L-shaped plan irregular buildings with two different hybrid base isolation systems. HDRB, LRB, and FS types of the isolator are used for the base isolation system. Dynamic nonlinear analysis and x and y directional seismic inputs are applied. Seismic responses of the structure with a fixed base and two different base isolation systems with HDRB+FS and LRB+FS are evaluated and results are presented comparatively. The results show that peak base shear values reduce 1/5 to 1/10 in base-isolated systems according to the fixed-base system. And also due to the difference between the fundamental period of the two isolation systems, peaks of the acceleration is higher for the LRB+FS isolation system. HDRB+FS isolation system shows higher acceleration and more regular behavior in time. Moreover, the LRB+FS isolation system has lower peak base displacements shows more rapid damping behavior in time. As a further investigation, Cancellara & De Angelis (2017) conducted research on assessment and dynamic nonlinear analysis of different base isolation systems for a multi-story RC building with irregularity in plan. They analyzed two base isolation systems are and compare their seismic behavior with a multi-story RC building as a reference. As a conclusion, the authors declared that the proper location in plan of friction sliders placed in parallel with elastomeric isolators (LRB or HDRB) appears to be a viable solution for the seismic response. And also this solution presents lower economic costs according to other alternative elastomeric solutions that use only LRB isolators or only HDRB isolators to provide the objective of decoupling the vibration modes of structures with plan irregularity. For the design of base isolated irregular structures, different modeling and analysis types can be utilized. Cancellara & De Angelis (2019) conducted research about the dynamic assessment of base isolation systems for structures with irregular plan. They performed a comparative evaluation between response spectrum dynamic analysis and nonlinear dynamic

analysis in terms of displacements and stresses. Results are quite informative and guiding for the consecutive investigations. Linear dynamic analysis with response spectrum is on the less conservative side and produces lower results for all stories in terms of inter-story drifts and member stresses compared to nonlinear dynamic analysis.

Etedali & Sohrabi (2015) have studied on the mitigation of torsional responses for asymmetric base isolated structures and they declared series of researches. Etedali and Sohrabi has compared the asymmetric base isolated and fixed based building about the torsional behavior. Various lead rubber bearings with different periods have been prepared to evaluate the effect of isolation degrees on seismic responses of the buildings. They have found that base isolation significantly reduces the rotation of stories but this effect is negligible for large eccentricities. Investigation results show that as the period of isolation system increases then displacement of isolators placed on flexible edge increases, this may result in increase the risk of buckling and detachment of the rubbers of isolators. In addition, as the stiffness of the flexible edge of isolation system increases then torsional responses of asymmetric structure reduce Furthermore, the increasing the flexible edge stiffness of isolation and superstructure system simultaneously causes a reasonable reduction in the torsional seismic response of asymmetric structures (Etedali & Sohrabi, 2015).

Etedali and Kareshk (2022) conduct a research on mitigating torsional responses for the asymmetric base-isolated structures, proposed a design procedure for optimal distribution of isolators. Torsional response of the isolation system and superstructure together identify the torsional behavior of the total base-isolated structure. Three different model cases are prepared according to base isolation with various horizontal stiffness. Case A: Isolators traditionally have horizontal effective stiffness according to gravitational load on each isolator. Case B: Isolators have horizontal effective stiffness according to the arithmetic mean of an optimal distribution of isolators in the base story. Case C: Isolators are defined as optimal vectors of the horizontal stiffness based on a weighted average of the horizontal effective stiffness. Responses are investigated under different seismic inputs. All

structural models are prepared with different eccentricities as $e = 10, 20, 30\%$, in the X direction, Y direction, and bidirectional. Nonlinear time-history analyses are performed for all structural models. A particle swarm optimization algorithm is performed. The isolator distribution is optimized by using this algorithm. Therefore, the torsion peak value of the stories can be reduced to the minimum level. Comparative results represent, case C reduces the maximum torsion of stories for all eccentricities. Finally, the researchers declare that case C shows the best performance among the other bearings in the decreasing of torsional behavior of asymmetric base-isolated structures (Etedali & Kareshk, 2022).

Understanding the irregularity effect on the city building stock, Tena & Colunga (2021) presents a large scale field-work. The research is about the conditions of structural irregularities with the observation about earthquake damages in Mexico City in 2007. They declared that the irregular structures especially associated to torsion, soft stories, weak stories and flexible diaphragms demonstrate unsatisfactory seismic performance. The authors 2458 damaged structures were surveyed in Mexico City during the September 19, 2017 earthquake which underwent moderate damage to collapse. 1278 structures were found to have at least one condition of strong irregularity (soft stories, corner structures and sources of strong torsional responses). 935 structures (43.3%) had other conditions of structural irregularity. In the light of this comprehensive investigation, the authors gave essential advice for the improvement of codes and regulations. They concluded that additional conditions of strong irregularity should be considered. These conditions are defined as basically: a) reentrant corners with L, C, U, I, H, X and Y irregular plans, b) flexible diaphragms, c) structures with no diaphragms, d) structures having simultaneously long plans ($L1/L2 > 2.5$) and global slenderness ($H/L2 > 2.5$) and, e) important or multiple setbacks along with the height, particularly in slender structures ($H/L2 > 2.5$). Reentrant corner irregularity definition should be more practical so that most engineers would easily recognize it.

CHAPTER 3

MODELLING AND ANALYSIS

The building classification criteria and modeling features have been presented in detail. Different model sets are utilized to evaluate the effect of various conditions on the base isolated structure. LRB characteristics are provided for specific buildings. In addition, seismic input is also presented for response history analysis. Features of 11 ground motions with three components set for three different site classes are given in a tabular way in detail.

3.1 Description of Building Model Sets

3 main geometrical type of base isolated reinforced concrete irregular structure set is prepared for this study. The first type is T shaped, the second type is U shaped and the third is square shaped buildings. For T and U shaped buildings, 4 different models are prepared according to different geometric plan ratios. Square shaped symmetrical base isolated building is also evaluated and presented with the other model sets for comparison. Also, the 3 different building with non-homogenous mass distribution in plan for isolated buildings; has been prepared. Loading of T4, U4 and SYM type buildings are arranged to create mass concentration on one part of the building in plan for each story. These generated buildings have the same mass as the original models. Moreover, to examine the isolator group effect Type U4 model has been prepared with different isolator group numbers. All buildings have 8 stories and 6m grid spacing. And also all have the same framing and loading properties. Buildings are modeled in ETABS. The summary of the comparative tables of the buildings are presented in Table 3.1 to Table 3.4. The geometrical definitions of geometrical plan irregularity ratio is given Figure 3.1.

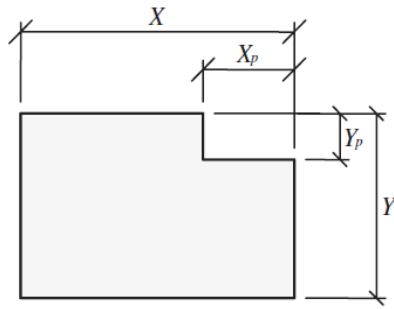


Figure 3.1. Geometrical definitions

Table 3.1 Building member properties for T shaped

#	Visuals of models	Type of Building Model	Geometric Plan Irregularity Ratio	Weight (G+0.3Q) (kN)	Period (T) (sec)	Eccentricity (Abs) %
1		SYM	1	621133.15	3.55	0.000
2		Type T1	$Y_p/Y=1/10$	211563.08	3.54	0.250
3		Type T2	$Y_p/Y=3/10$	238354.10	3.54	0.167
4		Type T3	$Y_p/Y=5/10$	265145.13	3.53	0.034
5		Type T4	$Y_p/Y=7/10$	291936.15	3.53	0.189

Table 3.2 Building member properties for U shaped

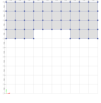
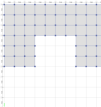
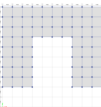
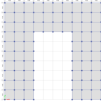
#	Visuals of models	Type of Building Model	Geometric Plan Irregularity Ratio	Weight (G+0.3Q) (kN)	Period (T) (sec)	Eccentricity (Abs) %
6		Type U1	$Y_P/Y=1/10$	236715.63	3.53	0.292
7		Type U2	$Y_P/Y=3/10$	313811.75	5.53	1.111
8		Type U3	$Y_P/Y=5/10$	390907.86	3.53	0.083
9		Type U4	$Y_P/Y=7/10$	468003.98	3.53	0.95

Table 3.3 Building member properties for mass concentrated buildings

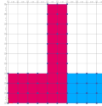
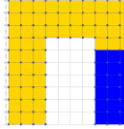

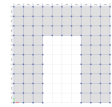
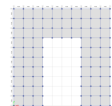
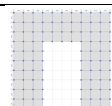
#	Visuals of models	Type of Building Model	Geometric Plan Irregularity Ratio	Weight (G+0.3Q) (kN)	Period (T) (sec)	Eccentricity (Abs) %
10		T4 Mass	$Y_P/Y=7/10$	291936.15	3.53	0.483
11		U4 Mass	$Y_P/Y=7/10$	468003.98	3.53	0.933
12		SYM Mass	1	621133.15	3.53	1.443

Table 3.4 Building member properties for U4 building with different isolator groups

#	Visuals of models	Type of Building Model	Geometric Plan Irregularity Ratio	Weight (G+0.3Q) (kN)	Period (T) (sec)	Eccentricity (Abs) %
13		Type GR1U4	$Y_P/Y=7/10$	468003.98	3.53	0.95
9		Type U4 (GR3)	$Y_P/Y=7/10$	468003.98	3.53	0.95
14		Type GR5U4	$Y_P/Y=7/10$	468003.98	3.53	0.95

3.1.1 T shaped building set

Four different ETABS models have been prepared. Each one of them has a different Y_P/Y ratio. Geometrical definitions of Y_P and Y values are given in Figure 3.1. T1 has the minimum and T4 is the maximum Y_P/Y ratio. All buildings have 8 stories and all have the same loading features. L is the maximum building plan length that is equal to 60m. with 10 bays. Grid spacing is 6m for both directions. T-shaped model set visuals have been given in Figure 3.2 and Figure 3.3.

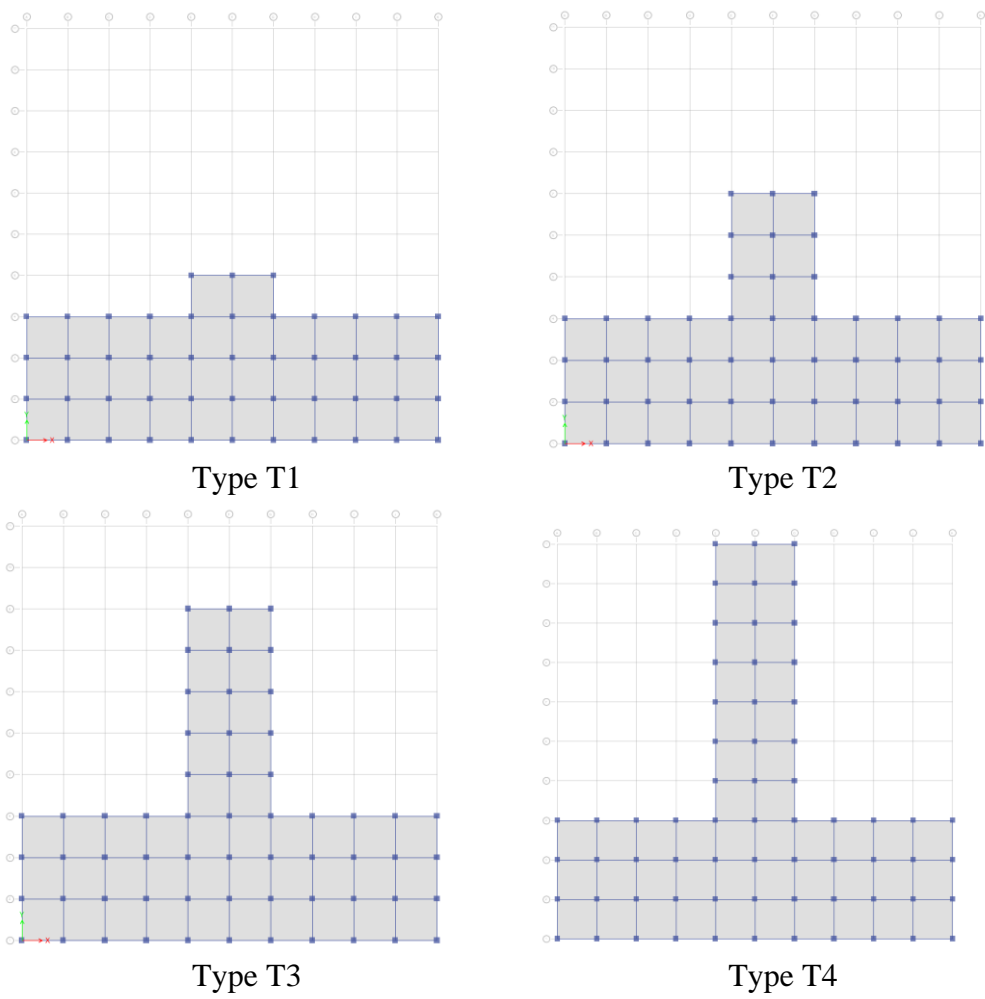


Figure 3.2. T-shaped Model Set

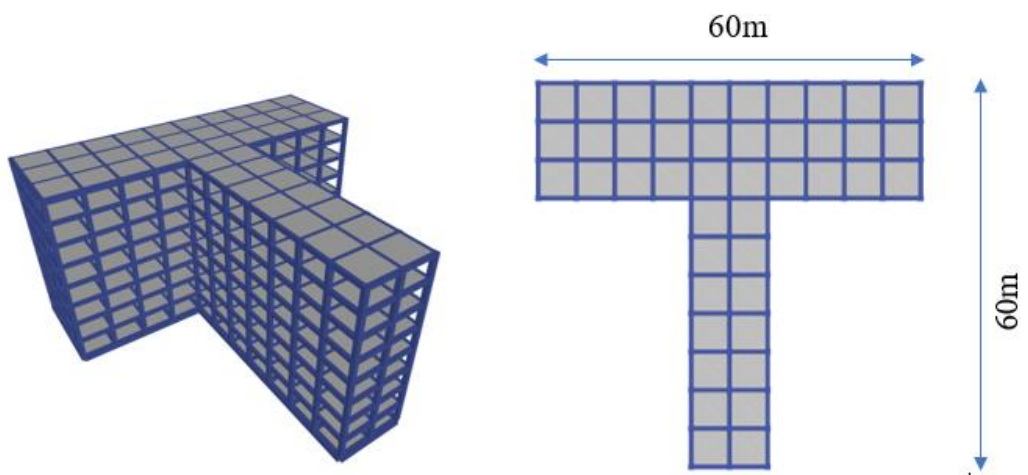
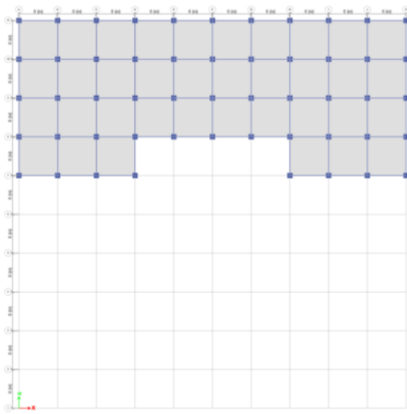


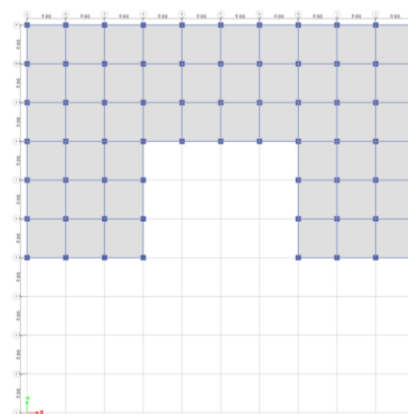
Figure 3.3. T4 Model 3D and Plan View

3.1.2 U shaped building set

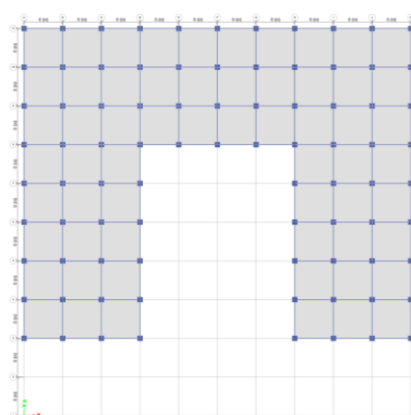
Same as the T-shaped set procedure; four different ETABS models have been prepared. Each one of them has a different Y_P/Y ratio. U1 has the minimum and U4 is the maximum Y_P/Y ratio. L is the maximum building plan length that is equal to 60m. with 10 bays. Grid spacing is 6m for both directions. All buildings have 8 stories and all have the same loading features. U-shaped model set visuals have been given in Figure 3.4 and Figure 3.5.



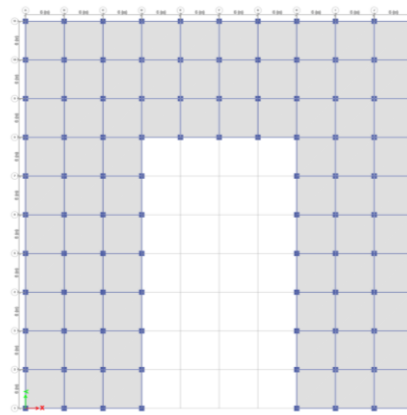
Type U1



Type U2



Type U3



Type U4

Figure 3.4. U-shaped Model Set

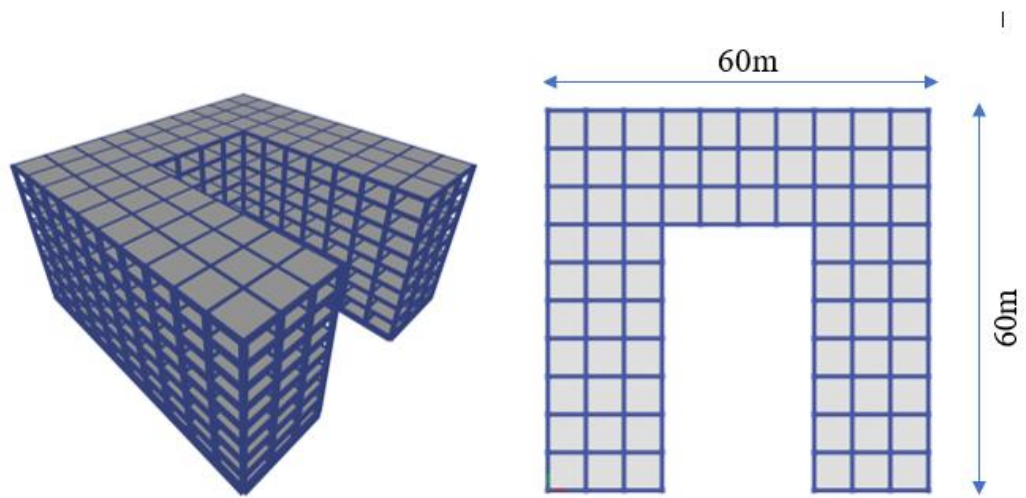


Figure 3.5. U4 Model 3D and Plan View

3.1.3 Square symmetrical model

This model consists of 10 bays with 6m spacing in each direction and the geometric shape is square and completely symmetric. The building plan length is 60m. The building has 8 stories and the same loading features. This symmetrical model provides a reference point and helps the comparison with the type T and type U models results. SYM model visual has been given in Figure 3.6 and Figure 3.7

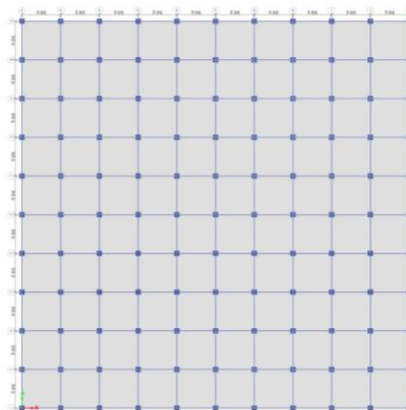


Figure 3.6. SYM Model

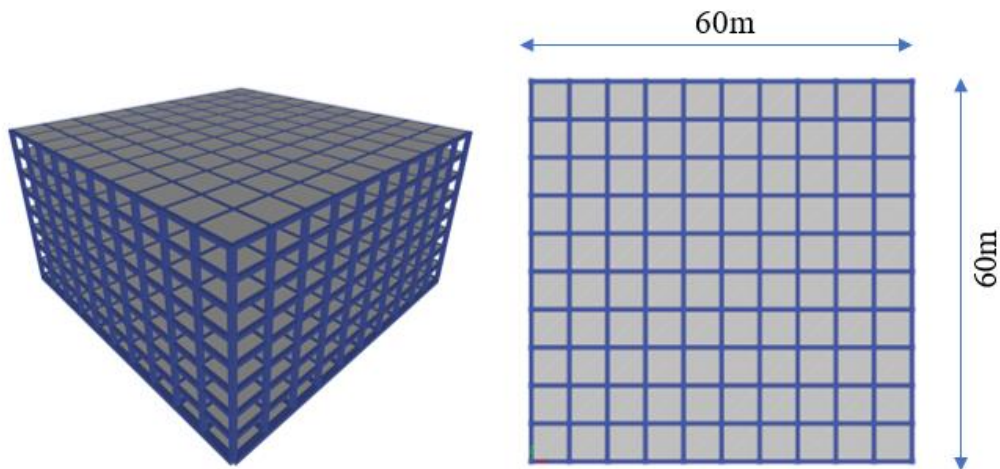
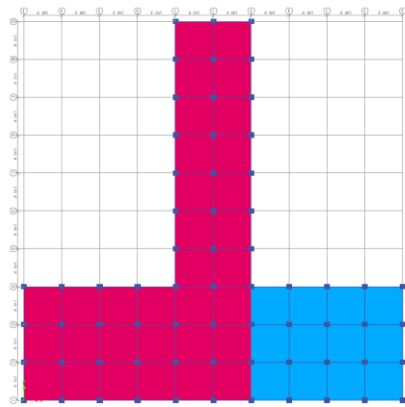


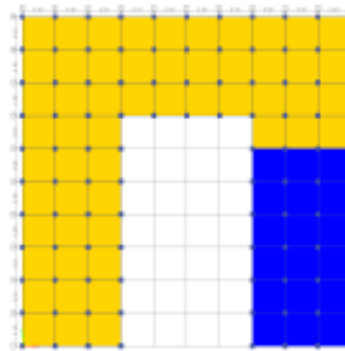
Figure 3.7. SYM Model 3D and Plan View

3.1.4 Non-homogeneous mass distributed building set

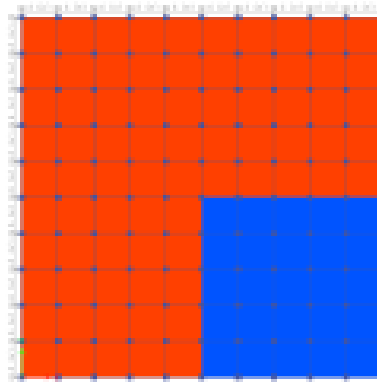
3 different ETABS model is prepared with non-homogenous mass distribution in the plan (Figure 3.1). The first model has been reproduced from the type T4 model. The floor shells placed in one part of the model have been loaded with a higher dead load according to the remaining floor shells of the story. The same loading feature has been applied for all stories. The second model is derived from the type U4 building model with homogeneous mass distribution. One part of the floor shells has been loaded with the higher dead load. SYM Mass model is prepared base on SYM Model. High uniform dead load has been applied on the quarter of total floor shells. All generated mass concentrated buildings have the same mass as the base models. This can be also observed in Table 3.1, Table 3.2 and Table 3.3.



Type T4 Mass



Type U4 Mass



SYM Mass

Figure 3.8. Non-homogeneous mass distribution model set

3.1.5 Building model set with different isolator configurations

In the scope of this case; non-linear time history analysis has been performed for U4 model with three different isolator group configurations. 3 isolator group have been utilized for all the model sets except this model set. In addition to main U4 model with 3 different isolator configurations, U4 with one isolator group and U4 with five isolator groups have been prepared for comparative evaluation. In isolator group constitution, the selection of isolator classes has been typically decided on vertical level ranges among isolators. The critical point is to decide on using one class of

vertical load isolators even if most of the vertical loads are different. In this case, one option is to use average vertical loads of isolators in defining isolator characteristics so that the structural period will be the same as in other cases. The second option is to use a maximum vertical load for the design of isolators that will result in a high resistance for the isolator compared to option one. For the second case, target structural period will be less and the structure will get more demands due to less isolation. For the first case, isolator design with high vertical load needs to be checked for stability. In this thesis, the first case is used to maintain the same period of $T=3.5\text{sec}$ as other structures. Eccentricities of the superstructure and the isolation system are given in Table 3.7. It is observed that the center of rigidity of the three types of buildings is located nearly close the each other.

Table 3.5 Eccentricities of superstructure and isolation system

Building Name	Superstructure CM Coordinate (m)	Superstructure CR Coordinate (m)	Isolation System CM Coordinate (m)	Isolation System CR Coordinate (m)	CR Eccentricity Distance (Superstructure and Isolation System) (m)	Ecc ratio (e) %
U4 Gr1	33.20	32.63	32.53	32.52	0.110	0.183
U4 Gr3	33.20	32.63	32.53	32.58	0.047	0.078
U4 Gr 5	33.20	32.63	32.52	32.59	0.045	0.075

3.1.6 Modal Deformed Shapes for Building Sets

The deformed shapes and periods for the first three modes are given in Figure 3.9 to Figure 3.13.

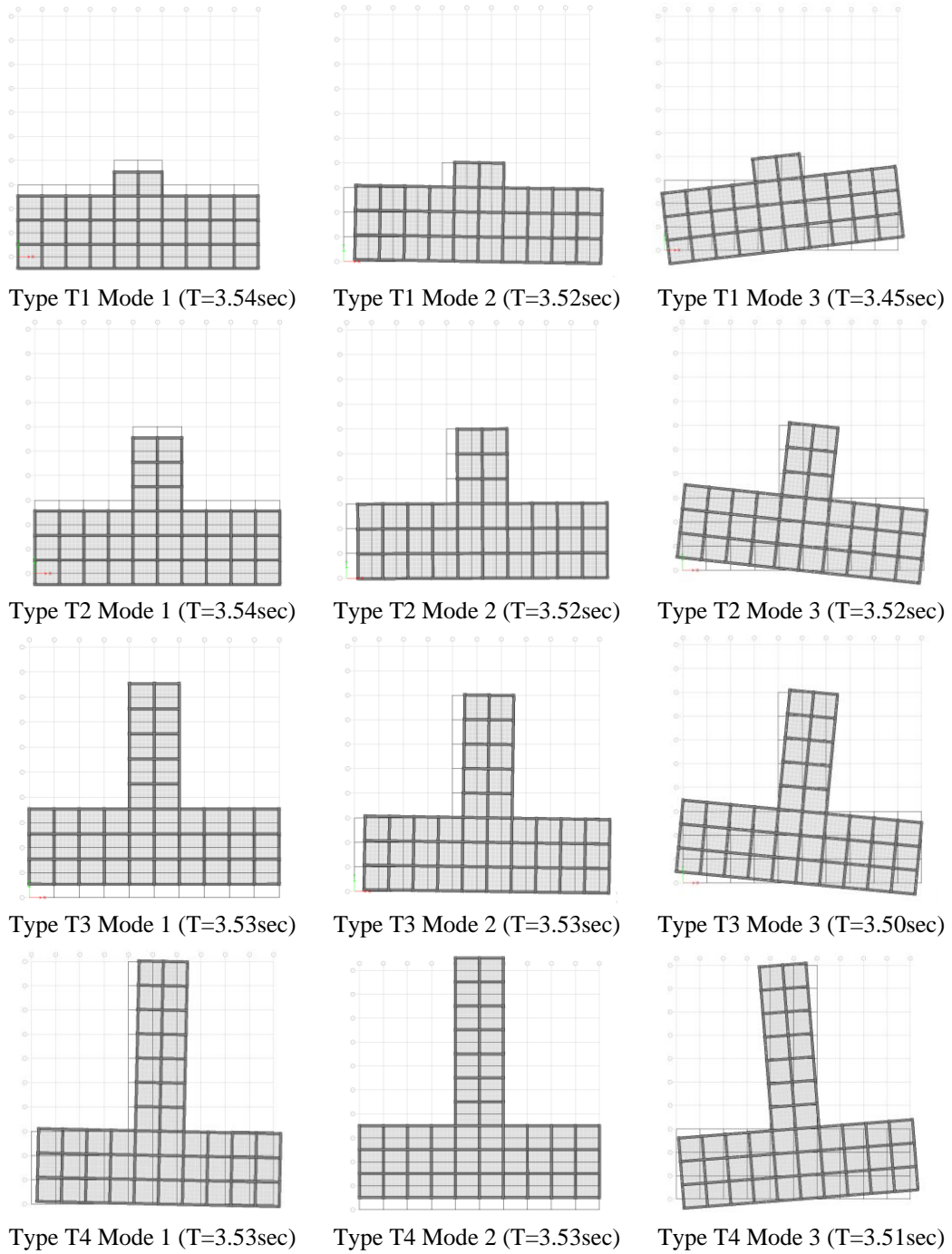


Figure 3.9. Mode shapes of T-shaped model set (Plan view of 8th story)

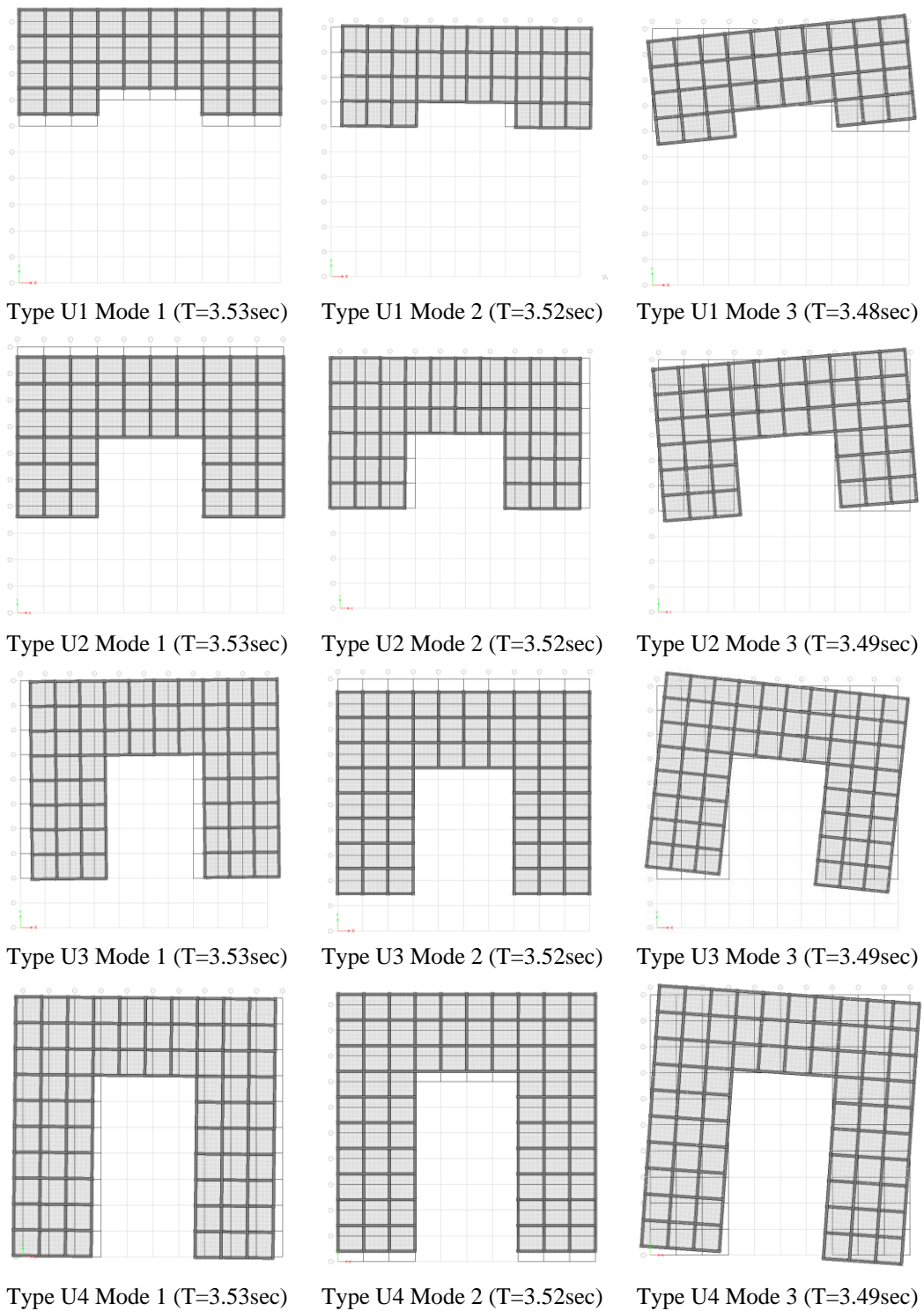


Figure 3.10. Mode shapes of U-shaped model set (Plan view of 8th story)

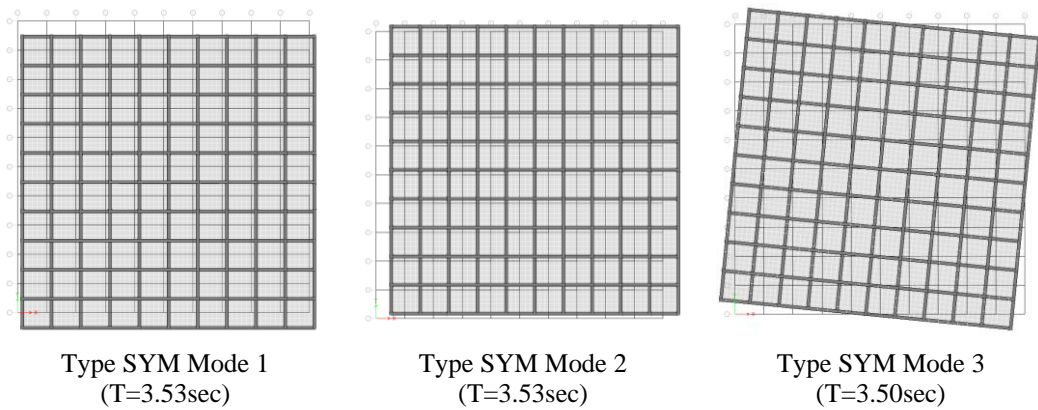


Figure 3.11. Mode shapes of SYM model set (Plan view of 8th story)

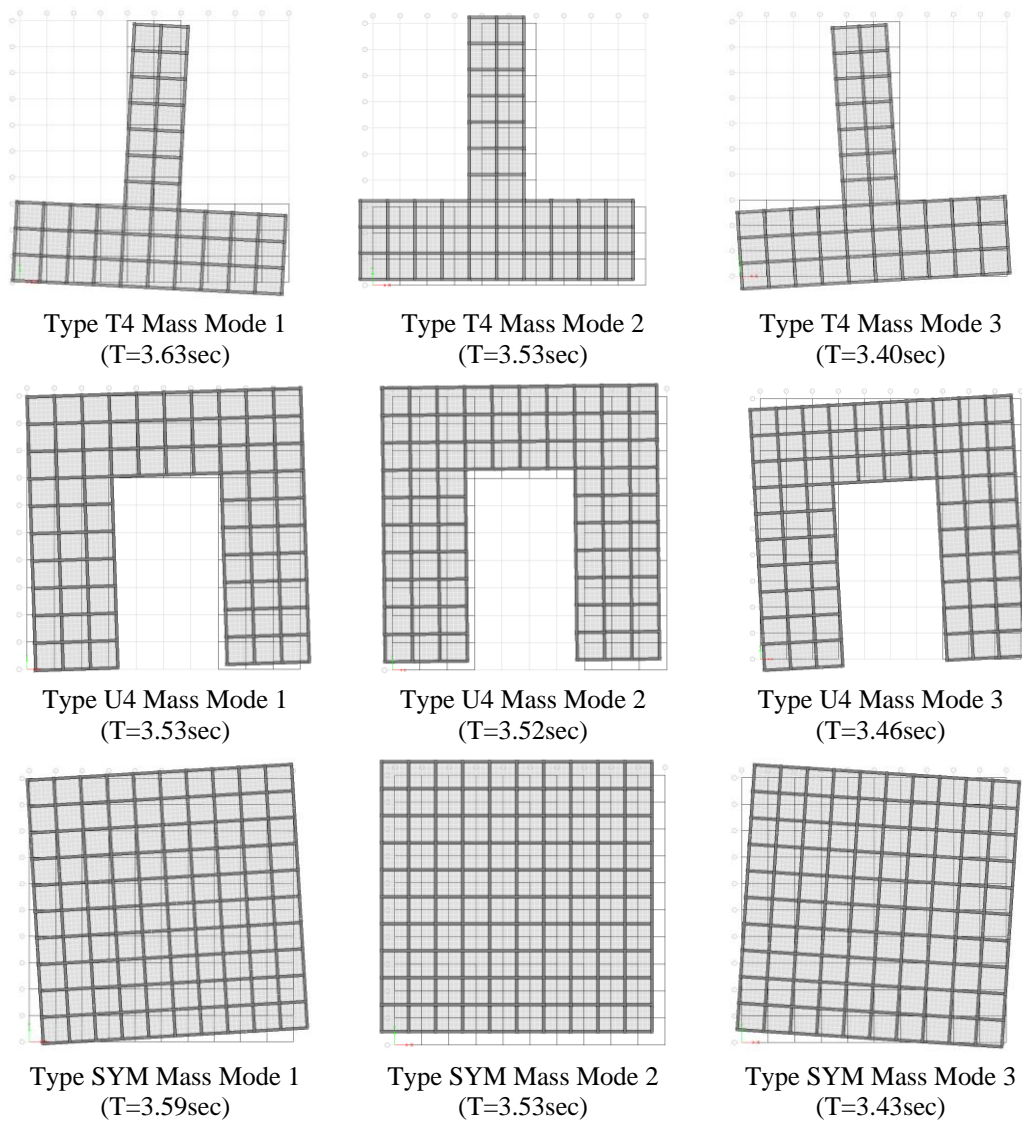
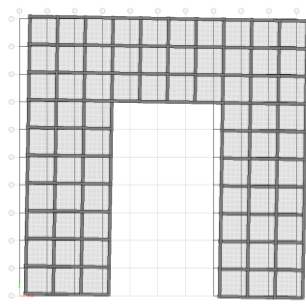
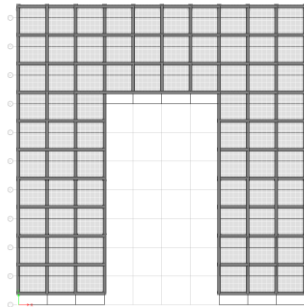


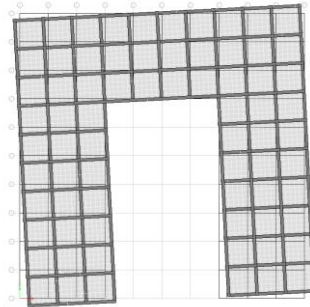
Figure 3.12. Mode shapes of mass concentrated model set (Plan view of 8th story)



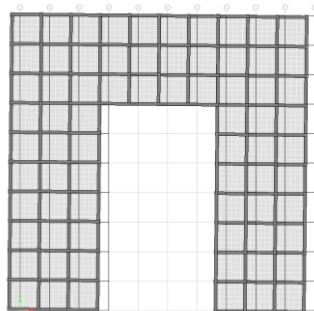
Type U4GR1 Mode 1
(T=3.54sec)



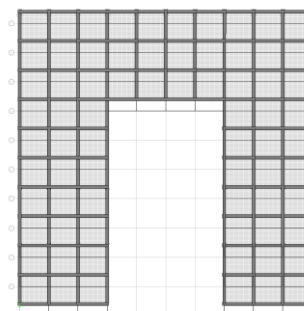
Type U4GR1 Mode 2
(T=3.52sec)



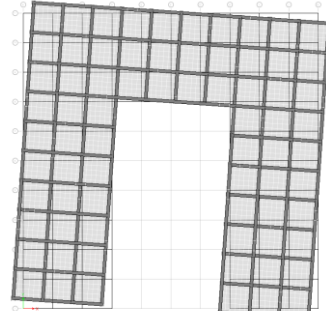
Type U4GR1 Mode 3
(T=3.39sec)



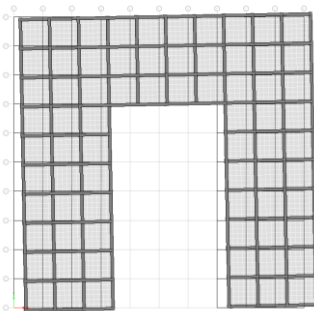
Type U4GR3 Mode 1
(T=3.53sec)



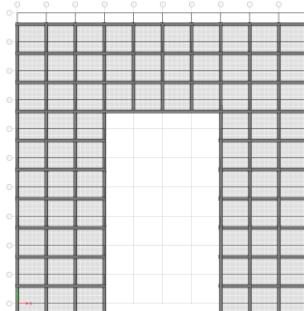
Type U4GR3 Mode 2
(T=3.52sec)



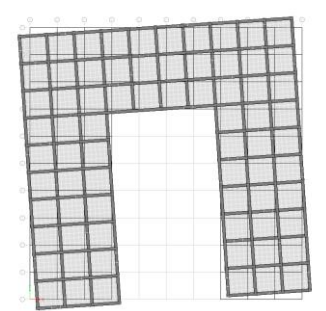
Type U4GR3 Mode 3
(T=3.49sec)



Type U4GR5 Mode 1
(T=3.53sec)



Type U4GR5 Mode 2
(T=3.52sec)



Type U4GR5 Mode 3
(T=3.50sec)

Figure 3.13. Mode shapes of isolator group effect model set (Plan view of 8th story)

3.2 Material Properties

All reinforced concrete members have the same material properties given in Table 3.6

Table 3.6 Material properties of concrete

Properties		Unit
Modulus of Elasticity	33000	MPa
Shear Modulus	13750	MPa
Unit Weight	25	kN/m ³
Poisson's Ratio	0.2	
Specified Compressive Strength	30	MPa

3.3 Building Framing Properties

All buildings have 8 stories with 4m story height. All buildings have the same framing type that consists of column, beam and slab presented in Table 3.7. And also the same loadings are affected on the member for all buildings except for the mass concentrated buildings.

Table 3.7 Building member properties for all building types

RC Members	Width(cm)	Height(cm)
Column	80	80
Beam	50	70
Slab(thickness)		20
Slab thickness (isolation level)		60
Beam (isolation level)	100	100

3.4 Building Loading Properties

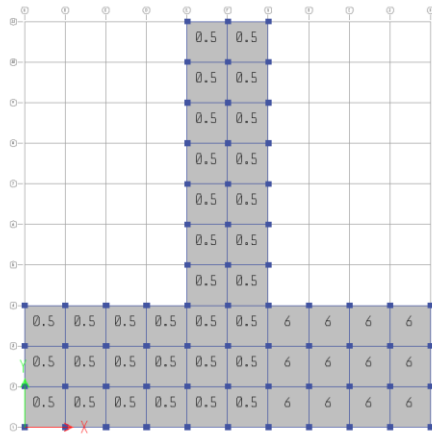
All building sets have the same loading features. The slab loading properties has been given in Table 3.8 and beam loading properties have been given in Table 3.9. But T4 Mass, U4 Mass and SYM Mass buildings have different loading from the original models. The slabs where only one side of the model is loaded heavier under dead load according to the remaining part as given in Figure 3.14 but the other loading properties are the same with base models.

Table 3.8 T, U, SYM Type of Buildings Slab Loading Properties

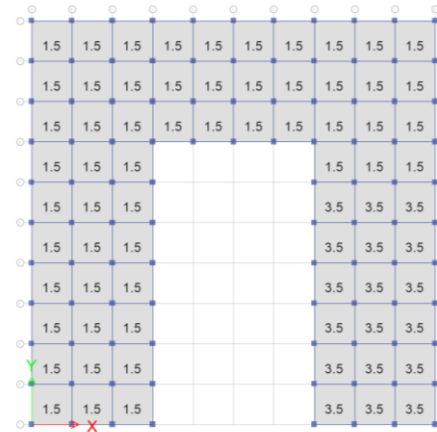
	<i>Dead</i>	<i>Live</i>
RC Members	<i>(kN/m²)</i>	<i>(kN/m²)</i>
Slab (20cm)	2	5
Slab (60cm) (isolation level)	2	5

Table 3.9 Beam Loading Properties

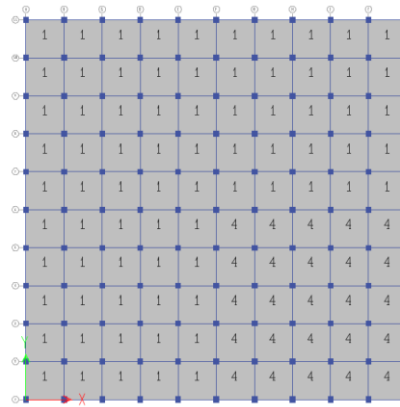
	<i>Dead</i>	<i>Live</i>
RC Members	<i>(kN/m)</i>	<i>(kN/m)</i>
Beam (50/70cm)	10	
Beam (100/100cm) (isolation level)	10	



Type T4 Mass



Type U4 Mass



SYM Mass

Figure 3.14. Dead load on floors for non-homogeneous mass distribution model set

For T4 Mass type building, 12 slabs are loaded as 6 kN/m² under dead load and the remaining 32 slabs are loaded as 0.5kN/m². For U4 Mass type building, 18 slabs are loaded as 3.5kN/m² under dead load and the remaining 54 slabs are loaded as 1.5kN/m². For SYM Mass type building 12 slab is loaded as 6kN/m² under dead load and the remaining 32 slabs are loaded as 0.5kN/m².

3.5 Isolator Properties

For all buildings given in Table 3.1, three types of LRB isolators with different characteristics have been utilized according to axial load levels. Isolator preliminary design has been performed under response spectrum analysis. This study evaluates the seismic responses based on non-linear response history analysis. Then, LRB isolators are defined as a multilinear plastic link element in ETABS models. Isolator characteristics have been calculated and designed separately for each building considering the unique properties and loading conditions. Isolator properties used in type T2 building non-linear analysis are given in Table 3.10. In the scope of this study, observing the seismic responses of various buildings has been performed under three site classes. In brief, one building has been analyzed and examined utilizing three ground motion sets with completely the same characteristics. The isolator design has not been revised according to different seismic inputs. That is aim is to perform the controlled test with one variable parameter. It can be said that a unique building placed on three different sites has been evaluated. All building seismic responses in this study have been calculated considering the approach described above. The main parameters for isolators used in model T2 has been provided in Table 3.10, including the post-yielding stiffness (K_d) ratio (K_d/W), characteristic strength (Q_d) ratio (Q_d/W), effective stiffness (K_{eff}), lead core diameter.

Table 3.10 Sample isolator properties for T2 building (for $T=3.5$ sec, Effective Damping Ratio =0.28)

Isolator Name	Seismic Weighth (kN)	Q_d/W	K_d/W	K_{eff} (kN/m)	BL Lead Core Diameter	B Isolator Diameter	BL/B Ratio	T_r Total Rubber Height (mm)	Target Displacement (m)
LRB1	5750	0.052	0.1864	1888	0.195	0.90	0.22	433.00	0.33
LRB2	3810	0.052	0.1868	1254	0.159	0.80	0.20	450.00	0.33
LRB3	2510	0.052	0.1871	828	0.129	0.75	0.17	465.00	0.33

CHAPTER 4

METHODOLOGY

The design procedure and methodology has been described in this part of the thesis. Seismic input and procedure stages has been given in Chapter 4.1. Iterative LRB design is performed utilizing response spectrum analysis. LRB design procedure is presented in Chapter 4.2. The results are examined for the critical engineering demand parameters. These are global parameters such as base shear ratio (BSR), interstory drift ratio (IDR), maximum over average story displacement ratio, peak floor acceleration (PFA) and additionally joint drift ratio (JDR) given in Chapter 4.3. Thesis methodology procedure is given in Figure 4.1 as a flowchart.

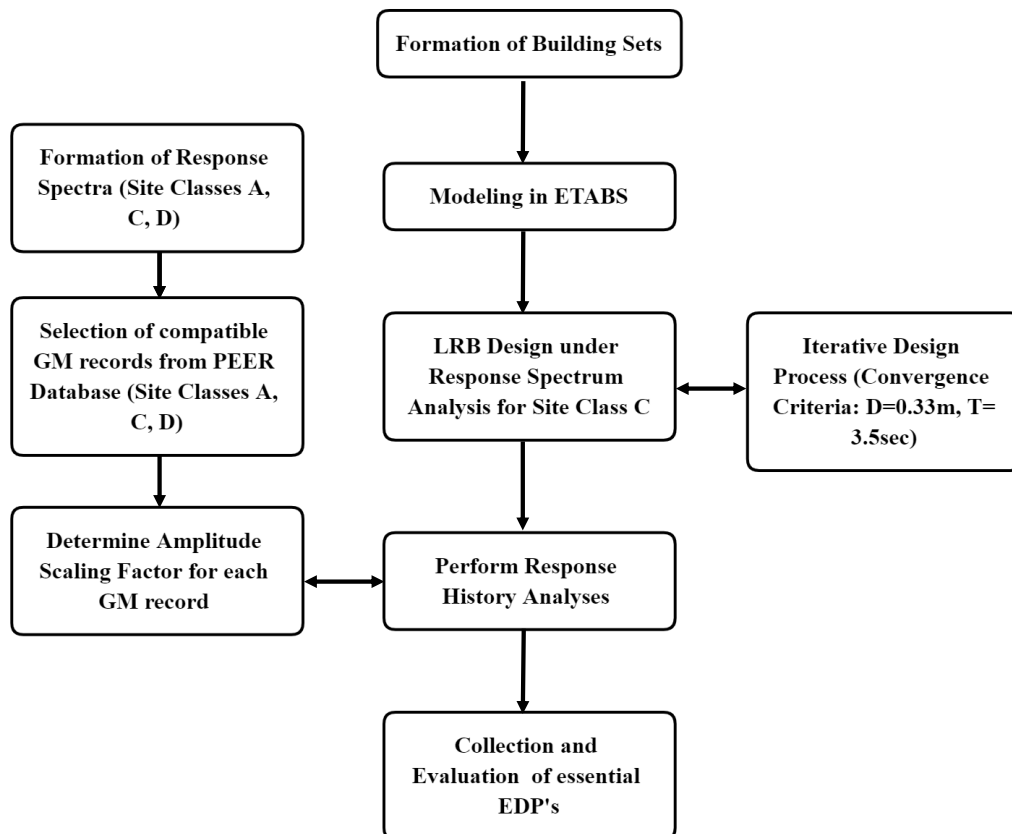


Figure 4.1. Flowchart of the Methodology

4.1 Seismic Input

4.1.1 Earthquake Response Spectrum

For all sets of models considered in the scope of this study, seismic demand input has been provided according to ASCE 7.16 with three different Site Classes. Spectral response curves for 2475 year return period have been generated for Site Class A, Site Class C and Site Class D based on ASCE 7.16. Isolator design and superstructure results examination have been performed under 2475 year (MCE) return period data. Ground motion spectra and response spectra curves for Site Class C will be explained in Chapter 4.1.2.

4.1.2 Response History

Nonlinear response history analysis has been utilized for seismic performance assessment. Eleven strong ground motion records were selected from the PEER NGA Database for each site class. Alternatively, different databases could be referred and/or simulated ground motion records calibrated for the region of interest could be utilized (Ozsarac et al., 2021), (Dicleli, 2006). These ground motion records have similar magnitudes and they have been picked from around the world. Due to the limitation of real ground motion data with exact criteria, different fault mechanisms have been allowed during the record selection process. Besides, the pulse effect has not been explicitly defined and evaluated in this study, though a recent study has shown that near field ground motions with pulse effects might yield considerably different responses concerning ordinary ground motions (Kitayama & Constantinou, 2022).

The sets of strong ground motion records have been scaled following two steps. As the first step, alternative records have been scaled to match their spectra to the target spectra while the ground motion scaling method has been chosen as “Minimize MSE” where MSE is weighted mean squared error computed for period range

defined by TBEC-2018 (i.e., approximately $0.50T_M < T_M < 1.25T_M$ band). Records with lower MSE values and tolerable scale factors have been chosen to form the 11-record set. Afterward, a second scale factor has been determined to make the arithmetic mean of spectral values obtained from the selected record set be greater than (or at least equal to) the values of the target spectra over the period range of interest. The two scale factors formed the final amplitude scaling factor for each record and these factors are given in Table 4.1, Table 4.2 and Table 4.3. Scaled acceleration response spectra of the selected ground motion records for each Site Class and their mean spectra are plotted in Figure 4.2, Figure 4.3 and Figure 4.4.

The fundamental periods (T_M) of all structures considering both directions are very close to each other as $T_M \cong 3.5$ sec for MCE. Considering all buildings, mass participation ratios (MPR) for the fundamental periods are at least 93%. Mass participation ratios for the first 10 modes of all buildings have been presented in Table 4.4. $0.50T_M$ - $1.25T_M$ period range is prescribed by (TBEC, 2018) to match the selected record suits to the target spectrum. The values of $0.50T_M$ and $1.25T_M$ are considered as 1.7sec and 4.5sec, respectively. Seismic isolation design has been performed considering the fundamental mode with the largest mass participation. Consequently, higher modes with insignificant mass participation are not expected to influence the seismic response of the structure.

In ETABS, nonlinear link elements have been employed for isolator modeling. For the efficient calculation of structural systems, Fast Nonlinear Analysis (FNA) has been utilized. For the modal combination, the CQC (Complete Quadratic Combination) technique is used as most of the codes suggested. For the directional combination of responses, SRSS method is employed. This method combines the responses for different directions of loading by taking the square root of the sum of their squares and assuming that responses of the modes are all statistically independent.

Table 4.1 Strong ground motion records for Site Class A utilized in the non-linear response history analysis

#	Earthquake Name	Record Sequence	Year	Vs30 (m/sec)	T _p Pulse Period (sec)	Magnitude M _W	Mechanism	Arias Intensity (m/sec)	R _{jb} (km)	R _{rup} (km)	Scale Factor 1	Scale Factor 2	Final Scale Factor
1	San Fernando	77	1971	2016.13	1.64	6.61	Reverse	8.9	0.00	1.81	0.46	1.35	0.62
2	Loma Prieta	765	1989	1428.14	-	6.93	Reverse Oblique	1.7	8.84	9.64	1.47	1.35	1.99
3	Loma Prieta	789	1989	1315.92	-	6.93	Reverse Oblique	0.1	83.37	83.45	2.35	1.35	3.19
4	Loma Prieta	795	1989	1249.86	-	6.93	Reverse Oblique	0.1	75.96	76.05	2.19	1.35	2.97
5	Landers	879	1992	1369.00	5.12	7.28	Strike Slip	7.0	2.19	2.19	0.35	1.35	0.48
6	Northridge-01	1011	1994	1222.52	-	6.69	Reverse	0.2	15.11	20.29	4.02	1.35	5.45
7	Northridge-01	1050	1994	2016.13	0.59	6.69	Reverse	0.9	4.92	7.01	1.46	1.35	1.97
8	Northridge-01	1051	1994	2016.13	0.84	6.69	Reverse	8.7	4.92	7.01	0.81	1.35	1.10
9	Chi-Chi_ Taiwan	1257	1999	1525.85	-	7.62	Reverse Oblique	0.2	52.46	56.14	1.26	1.35	1.71
10	Chi-Chi_ Taiwan-05	2996	1999	1525.85	-	6.20	Reverse	0.0	49.84	50.44	4.49	1.35	6.09
11	Chi-Chi_ Taiwan-06	3325	1999	1525.85	-	6.30	Reverse	0.0	52.33	56.02	4.00	1.35	5.42

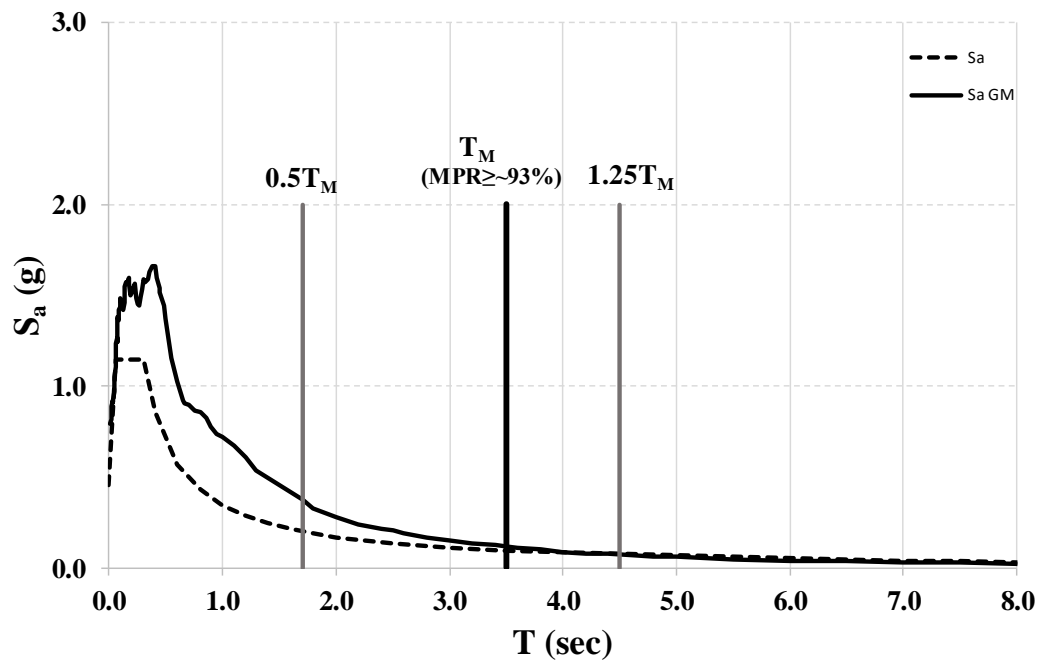


Figure 4.2. Linear elastic design spectrum and mean scaled acceleration response spectra of strong ground motions for Site Class A with 2475 return period (MPR: Mass Participation Ratio).

Table 4.2 Strong ground motion records for Site Class C utilized in the non-linear response history analysis

#	Earthquake Name	Record Sequence	Year	Vs30 (m/sec)	T _p Pulse Period (sec)	Magnitude M _w	Mechanism	Arias Intensity (m/sec)	R _{jb} (km)	R _{rup} (km)	Scale Factor 1	Scale Factor 2	Final Scale Factor
1	Kern County	14	1952	514.99	-	7.36	Reverse	0.3	81.30	82.19	3.09	1.32	4.07
2	Tabas_Iran	139	1978	471.53	-	7.35	Reverse	1.4	0.00	13.94	2.08	1.32	2.74
3	Imperial Valley-06	164	1979	471.53	-	6.53	Strike Slip	1.3	15.19	15.19	3.06	1.32	4.03
4	Irpinia_Italy-01	285	1980	649.67	1.71	6.90	Normal	0.4	8.14	8.18	1.90	1.32	2.50
5	Irpinia_Italy-01	286	1980	496.46	-	6.90	Normal	0.2	17.51	21.26	2.12	1.32	2.80
6	Irpinia_Italy-01	289	1980	455.93	-	6.90	Normal	0.8	13.34	17.64	2.33	1.32	3.06
7	Irpinia_Italy-02	297	1980	496.46	-	6.20	Normal	0.1	14.73	14.74	2.80	1.32	3.69
8	Irpinia_Italy-02	300	1980	455.93	-	6.20	Normal	0.5	8.81	8.83	2.27	1.32	2.99
9	Morgan Hill	448	1984	488.77	-	6.19	Strike Slip	0.8	3.22	3.26	3.31	1.32	4.36
10	Morgan Hill	451	1984	561.43	1.07	6.19	Strike Slip	3.9	0.18	0.53	2.12	1.32	2.79
11	Nahanni_Canada	495	1985	605.04	-	6.76	Reverse	3.9	2.48	9.60	1.62	1.32	2.13

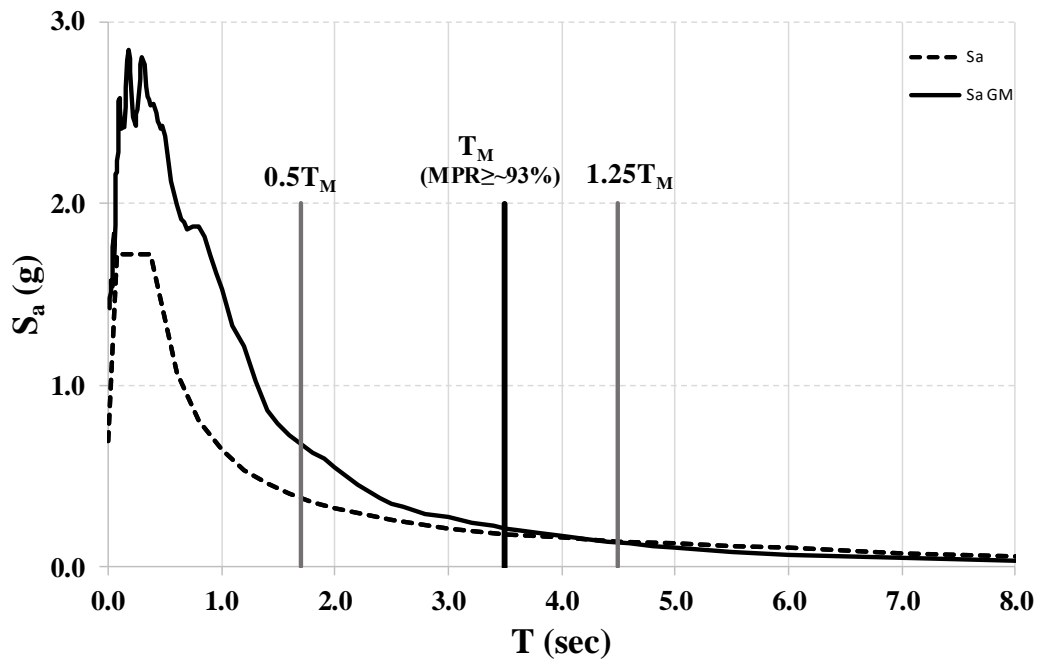


Figure 4.3. Linear elastic design spectrum and mean scaled acceleration response spectra of strong ground motions for Site Class C with 2475 return period (MPR: Mass Participation Ratio).

Table 4.3 Strong ground motion records for Site Class D utilized in the non-linear response history analysis

#	Earthquake Name	Record Sequence	Year	Vs30 (m/sec)	T _p Pulse Period (sec)	Magnitude M _w	Mechanism	Arias Intensity (m/sec)	R _{jb} (km)	R _{rup} (km)	Scale Factor 1	Scale Factor 2	Final Scale Factor
1	Imperial Valley-02	6	1940	213.44	-	6.95	Strike Slip	1.6	6.09	6.09	1.91	1.38	2.64
2	Northern Calif-03	20	1954	219.31	-	6.50	Strike Slip	0.5	26.72	27.02	1.80	1.38	2.48
3	Borrego Mtn	36	1968	213.44	-	6.63	Strike Slip	0.2	45.12	45.66	2.53	1.38	3.51
4	Managua_ Nicaragua01	95	1972	288.77	-	6.24	Strike Slip	2.0	3.51	4.06	2.69	1.38	3.73
5	Gazli_ USSR	126	1976	259.59	-	6.80	Reverse	5.7	3.92	5.46	0.93	1.38	1.29
6	Imperial Valley-06	180	1979	205.63	4.13	6.53	Strike Slip	1.7	1.76	3.95	0.65	1.38	0.90
7	Imperial Valley-06	181	1979	203.22	3.77	6.53	Strike Slip	1.8	0.00	1.35	0.53	1.38	0.74
8	Victoria_ Mexico	266	1980	242.05	-	6.33	Strike Slip	0.4	18.53	18.96	1.90	1.38	2.63
9	Westmorland	319	1981	193.67	-	5.90	Strike Slip	1.9	6.18	6.50	2.27	1.38	3.14
10	Coalinga-01	322	1983	274.73	-	6.36	Reverse	1.2	23.78	24.02	2.81	1.38	3.89
11	Coalinga-01	338	1983	246.07	-	6.36	Reverse	1.5	28.11	29.48	2.67	1.38	3.70

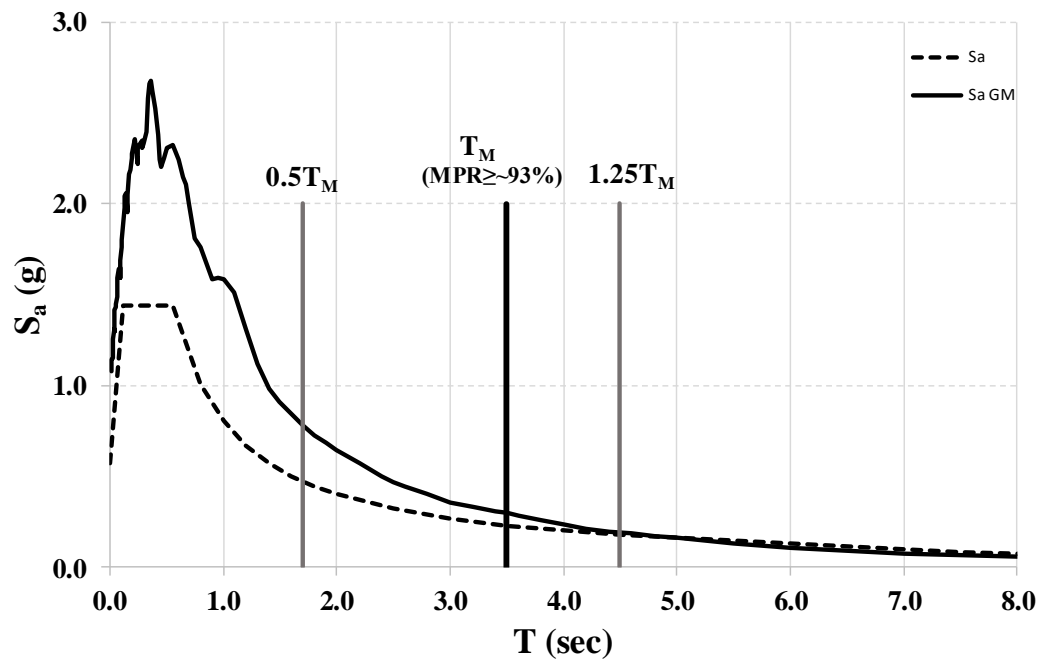


Figure 4.4. Linear elastic design spectrum and mean scaled acceleration response spectra of strong ground motions for Site Class D with 2475 return period (MPR: Mass Participation Ratio).

Table 4.4 Mass participation ratios for first 10 modes for all buildings

Building ID	Mode 1			Mode 2			Mode 3			Mode 4			Mode 5			Mode 6			Mode 7			Mode 8			Mode 9			Mode 10		
	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs	T (sec)	MPRs, CMPRs		
T1	3.540	0.000 0.000	3.517	0.987 0.998	3.451	0.012 0.000	0.639	0.000 0.002	0.582	0.000 0.000	0.578	0.000 0.000	0.282	0.000 0.000	0.267	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.172	0.000 0.000	0.170	0.000 0.000	0.170	0.000 0.000	0.170	0.000 0.000
T2	3.536	0.000 0.000	3.523	0.997 0.998	3.490	0.001 0.000	0.624	0.000 0.002	0.597	0.000 0.000	0.577	0.000 0.000	0.278	0.000 0.000	0.270	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.170	0.000 0.000	0.170	0.000 0.000	0.170	0.000 0.000	0.170	0.000 0.000
T3	3.533	0.000 0.000	3.527	0.986 0.998	3.498	0.012 0.000	0.616	0.000 0.000	0.613	0.000 0.000	0.577	0.000 0.000	0.276	0.000 0.000	0.273	0.000 0.000	0.263	0.000 0.000	0.263	0.000 0.000	0.263	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000
T4	3.533	0.000 0.000	3.531	0.993 0.998	3.506	0.000 0.000	0.630	0.000 0.000	0.603	0.000 0.000	0.577	0.000 0.000	0.290	0.000 0.000	0.276	0.000 0.000	0.263	0.000 0.000	0.263	0.000 0.000	0.263	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000	0.206	0.000 0.000
U1	3.533	0.000 0.000	3.518	0.994 0.998	3.484	0.005 0.000	0.624	0.000 0.002	0.584	0.000 0.000	0.569	0.000 0.000	0.279	0.000 0.000	0.269	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.171	0.000 0.000	0.171	0.000 0.000	0.171	0.000 0.000	0.171	0.000 0.000
U2	3.527	0.000 0.000	3.525	0.997 0.998	3.491	0.001 0.000	0.604	0.000 0.002	0.601	0.000 0.000	0.582	0.000 0.000	0.275	0.000 0.000	0.274	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.225	0.000 0.000	0.225	0.000 0.000	0.225	0.000 0.000	0.225	0.000 0.000
U3	3.528	0.000 0.000	3.523	0.989 0.998	3.495	0.009 0.000	0.612	0.002 0.000	0.592	0.000 0.000	0.561	0.000 0.000	0.273	0.000 0.000	0.269	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000
U4	3.532	0.000 0.000	3.521	0.979 0.999	3.499	0.019 0.000	0.622	0.002 0.000	0.586	0.000 0.000	0.565	0.000 0.000	0.282	0.000 0.000	0.279	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.261	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000	0.273	0.000 0.000
SYM	3.531	0.088 0.910	3.531	0.908 0.998	3.507	0.000 0.000	0.604	0.000 0.001	0.604	0.000 0.001	0.584	0.000 0.000	0.282	0.000 0.000	0.282	0.000 0.000	0.266	0.000 0.000	0.266	0.000 0.000	0.266	0.000 0.000	0.174	0.000 0.000	0.174	0.000 0.000	0.174	0.000 0.000	0.174	0.000 0.000
SYM MASS	3.592	0.215 0.215	3.530	0.814 0.814	3.432	0.184 0.184	0.607	0.000 0.001	0.603	0.000 0.001	0.561	0.000 0.000	0.284	0.000 0.000	0.282	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.179	0.000 0.000	0.179	0.000 0.000	0.179	0.000 0.000	0.179	0.000 0.000
T4	3.630	0.113 0.471	3.531	0.817 0.192	3.402	0.079 0.336	0.626	0.000 0.001	0.603	0.000 0.001	0.578	0.000 0.000	0.289	0.000 0.000	0.280	0.000 0.000	0.274	0.000 0.000	0.274	0.000 0.000	0.274	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000	0.262	0.000 0.000
U4	3.562	0.402 0.233	3.524	0.441 0.546	3.463	0.155 0.220	0.624	0.000 0.001	0.586	0.000 0.001	0.569	0.000 0.000	0.282	0.000 0.000	0.282	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000
U4	3.539	0.943 0.000	3.520	0.943 0.999	3.385	0.065 0.000	0.617	0.002 0.000	0.583	0.000 0.001	0.563	0.000 0.000	0.289	0.000 0.000	0.289	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000
U4	3.533	0.923 0.000	3.520	0.923 0.999	3.501	0.076 0.000	0.620	0.002 0.000	0.585	0.000 0.001	0.564	0.000 0.000	0.289	0.000 0.000	0.289	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000
CR5	3.533	0.923 0.000	3.520	0.923 0.999	3.501	0.076 0.000	0.620	0.002 0.000	0.585	0.000 0.001	0.564	0.000 0.000	0.289	0.000 0.000	0.289	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.264	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000	0.272	0.000 0.000

(*) T (sec) : Period for the specified mode
 MPR : Mass Participation Ratio in the specified direction for the specified mode
 CMPR : Cumulative Mass Participation Ratio in the specified direction

4.2 LRB Isolator Design Procedure

Due to the models being characterized by reentrant corner/irregularity in the plan, it is important within the design procedure to obtain the proper position and properties of the isolators to optimal decoupling the vibration modes of the structures and reaching the elongated period. At the first stage in the methodology base isolation system has been assumed as an equivalent linear isolation system to determine the dynamical properties of the base isolated structure. Secondly, the obtained properties have been adopted to a model with a nonlinear isolation system. The analysis is performed using this nonlinear model under response history seismic input which details have been given in Chapter 4.1.1. Damping level and optimum effective period are defined by the performance requirements of the structural system. However, identifying the optimum characteristics of the isolator to meet the demand of these parameters can be a complex study. Isolation systems mostly produce hysteretic damping and studies show that both damping and effective period change with a change in the displacement. The design procedure is required to be convergent and progressive as a function of the dependence on the displacement. During the application of the procedure, another complexity occurs because not only the effective period and damping but also the assumed bearing plan size changes with displacement. This results in loop determination aiming the displacement convergence as displayed in Figure 4.5.

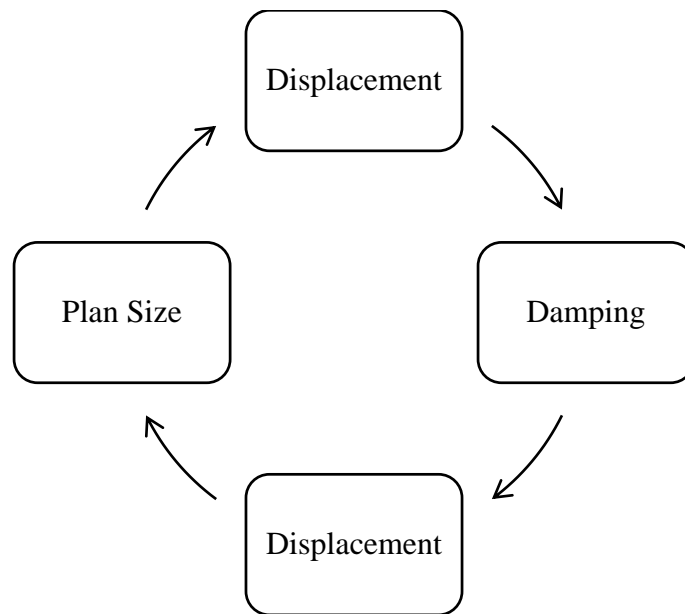


Figure 4.5. Iterative procedure for design

The progressive steps for design are as follows:

1. Choose a bearing plan dimension considering the vertical load and make an assumption for the displacement at the target period and damping for each of the isolator locations
2. For the displacement that was assumed, calculate the period, stiffness and equivalent damping
3. For the calculated stiffness and damping, calculate the actual displacement from the earthquake loading parameters
4. For the actual displacement calculate the revised damping. Check if it is necessary to repeat step 3.
5. Check if it is necessary to adjust the optimum plan size that is required to support vertical loads

This stepwise procedure is repeated until convergence is achieved. This can be automated by using a program yet one should be aware that the convergence might not be achieved since the limits on effective periods and damping in the usage of practical isolators. Increasing the vertical load on an elastomeric bearing is usually

effective in obtaining long effective periods. It is recommended to get support from manufacturers considering the complicated hardware design and the empirical properties for most types of isolators. It has become obvious to the manufacturers during the evolution of the base isolation technology that the structural engineers are lacking the skills to design hardware so they have been assisting with that. Necessary seismic performance is obtained by determining the number of rubber layers and lead core dimensions by doing iterative trial and error. The iterative process can be applied considering that the damping changes with the change in displacement. The procedure can be expressed in detail.

1. The first step is assuming the displacement based on total rubber thickness
2. Secondly, calculate the effective stiffness of the bearing for the assumed displacement
3. Then calculate the effective period with the total seismic mass and the effective period data
4. Calculate the equivalent viscous damping from the area of the hysteresis loop. Damping factor and shear modulus are determined for corresponding shear strain.
5. Calculate the damping factor for the equivalent viscous damping
6. Calculate the displacement from damping modified response spectrum at effective period.
7. Compare the calculated spectral displacement with Step 1. In case of the difference exceeding the acceptable tolerance, assume the calculated displacement as the starting displacement.

This progressive process is repeated till to the point of convergence. Vertical load conditions should be defined for each isolator type. Seismic performance is checked based on average DL+LL. Isolator capacity is further evaluated based on max. and min. load combinations are used to assess the total capacity. Linear response spectrum analysis is sufficient for preliminary design for base isolation systems with

LRB bearings. The stiffness of the bearings is calculated by dividing the force in the bearing by displacement. This is then used by the response spectrum analysis. The progressive nature of the analysis comes from that, if the calculated displacement is different from the assumed, effective stiffness should be adjusted and analysis should be repeated. During application, usually, several analyses are required since single mass approach usually gives a good estimate of displacement. In case that center of mass displacements above the isolators calculated with ETABS analyses are significantly different from the first assumption. Non-Linear Time History Analysis is preferred when there is; very soft soil, a system without a restoring force; a system dependent on velocity and a system that has limited displacement capacity. Nonlinear time history analysis has been recommended for the design of all base isolated structures due to building complexity. In response spectrum analysis; at a specific period, the response of each mode for spectral ordinate is determined. For isolation modes with higher periods, damping should be considered for LRB bearing. Most codes suggest the divide the spectrum values by damping factor B by covering the higher isolator periods. In the time history solution, the modal damping is applied for all calculated responses for all modes during the time history seismic data integration. As a result, there is not any requirement to modify input time history due to damping. Evaluation of seismic performance is done for maximum seismic events (MCE) for isolator design.

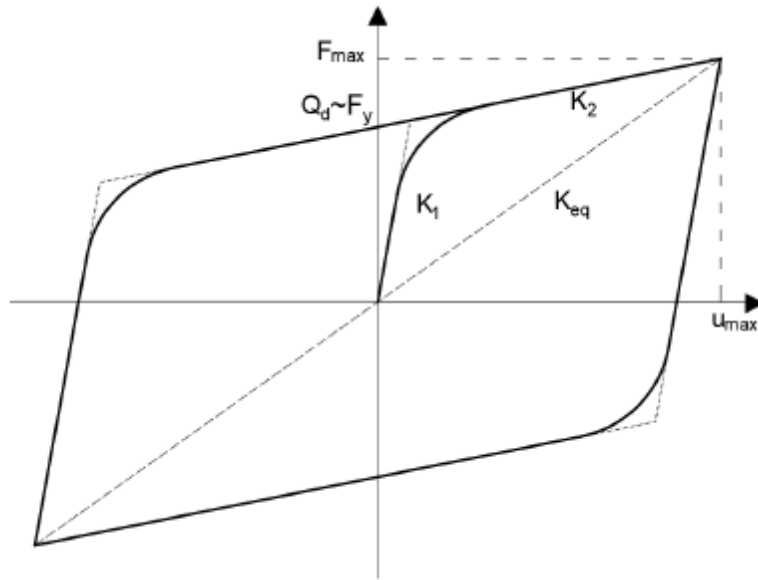


Figure 4.6. Hysteretic Curve of the Nonlinear Behavior of LRB
(Naeim & Kelly M. James, 1999)

The force-displacement and bi-linear model of LRB isolator is illustrated in Figure 4.6. To model the LRB isolators in ETABS, the properties of LRB have been determined in accordance with 4.1,4.2 and 4.3 as follows. The effective period of the base isolated system is expressed as

$$T_{eff} = 2\pi \sqrt{\frac{W}{g \cdot K_{eff}}} \quad 4.1$$

The effective stiffness of bilinear the base isolated system is expressed as (4.2) for $D > D_y$ where D_y is defined as the yield displacement. Q is the characteristic strength and K_2 is the post yield stiffness of the isolator.

$$K_{eff} = K_{eq} = K_2 + \frac{Q}{D} \quad 4.2$$

Effective damping β_{eff} is calculated as (4.3)

$$\beta_{eff} = \frac{4Q(D - D_y)}{2\pi k_{eff} D^2} \quad 4.3$$

The damping reduction factor is found out from Table 4.5 corresponding effective damping value calculated from 4.3

Table 4.5 Damping factor (ASCE/SEI 7-22, 2021)

Effective Damping, β_M (percentage of critical) ^{a,b}	B_M Factor
≤ 2	0.8
5	1.0
10	1.2
20	1.5
30	1.7
40	1.9
≥ 50	2.0

All building LRB isolation system have been designed based on approximately same properties for which are converged at Period $T \cong 3.5$ sec, Target Displacement $D \cong 0.33$ m, Effective Damping Ratio $\beta \cong 0.28$ end of the iteration process. But all isolators have different effective stiffness, lead core diameter, isolator diameter and total rubber height at the convergence point. Determined LRB properties for T2 building is given in Table 3.10 as a sample.

4.3 Description of Utilized Fundamental Engineering Demand Parameters

4.3.1 Interstory drift ratio (IDR)

Story drift is the horizontal deflection at the top of the story relative to the bottom of the story. The story drift ratio is calculated as story drift divided by the story height. This is a significantly improved seismic response and damage indicator. Even though code limitations have not been employed in this study, ASCE/SEI 7.22 limits the story drift ratio as $0.02h_{sx}$ for Nonlinear RHA. Under seismic actions considering three different site classes, peak story drift ratios have been recorded and presented for all model sets. IDR results of each building for each ground motion set composed of 11 individual records have been presented as a table in detail. Symmetrical building IDR responses of Site Class C ground motion set have been presented as an example for both orthogonal X and Y directions Table 4.6 and Table 4.7. All IDR result tables have been provided in Appendix A between Table A.1 and Table A.84. IDR Table shows the 11 individual ground motion names with two orthogonal directions, a total of 22 ground motions, in the first column. The first row represents each story name, from bottom to top increasingly. Each point is the peak IDR results for a given ground motion and story. The last column MIDR is the maximum interstory drift ratio among all stories for each ground motion record. In the lower part of the table statistical analysis of results is provided. For each story, minimum, maximum, mean, standard deviation, mean- σ and mean+ σ band values, Q1(lower bound), median and Q3(upper bound) determined values are presented respectively. In addition, Figure 4.7 display the IDR profile of a Symmetrical building as an example. IDR profile demonstrations of all buildings have been displayed in Appendix A. Between Figure A.1 and Figure A.14. IDR profile charts represent the interstory drift ratios and story, in X and Y directions respectively. The statistical determinations given in the lower part of Table 4.6 and Table 4.7 can be observed in Figure 4.7

Table 4.6 IDR results (Bldg: Symmetric – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001648	0.002035	0.002375	0.002170	0.001871	0.001600	0.001334	0.000926	0.002375
1_H2	0.002193	0.002135	0.002352	0.002194	0.002109	0.001721	0.001404	0.001033	0.002352
2_H1	0.001954	0.002405	0.002417	0.002415	0.002546	0.002187	0.001520	0.001073	0.002546
2_H2	0.003339	0.002795	0.002601	0.002816	0.003089	0.002396	0.001581	0.001042	0.003339
3_H1	0.001470	0.002002	0.002349	0.002568	0.002567	0.002348	0.001869	0.001190	0.002568
3_H2	0.002230	0.002762	0.002982	0.003048	0.002841	0.002452	0.001844	0.001167	0.003048
4_H1	0.002044	0.002097	0.002252	0.002176	0.001944	0.001568	0.001114	0.000707	0.002252
4_H2	0.002505	0.002054	0.002062	0.002103	0.002363	0.001859	0.001269	0.001000	0.002505
5_H1	0.002310	0.002301	0.002145	0.002339	0.002385	0.001932	0.001192	0.000815	0.002385
5_H2	0.001767	0.001984	0.001905	0.001963	0.001935	0.001597	0.001081	0.000745	0.001984
6_H1	0.001802	0.002109	0.002072	0.002203	0.002208	0.001848	0.001239	0.000767	0.002208
6_H2	0.001994	0.002485	0.002490	0.002484	0.002403	0.002027	0.001370	0.000870	0.002490
7_H1	0.001518	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
7_H2	0.001831	0.001900	0.001914	0.001806	0.001771	0.001419	0.001025	0.000684	0.001914
8_H1	0.002157	0.001972	0.002021	0.001918	0.001845	0.001575	0.001316	0.000902	0.002157
8_H2	0.001952	0.002542	0.002682	0.002808	0.002744	0.002335	0.001662	0.000985	0.002808
9_H1	0.002430	0.003189	0.003326	0.003395	0.003149	0.002495	0.001661	0.001122	0.003395
9_H2	0.002392	0.002983	0.003007	0.003137	0.003097	0.002564	0.001970	0.001330	0.003137
10_H1	0.002779	0.002999	0.003009	0.003329	0.003418	0.002866	0.002139	0.001494	0.003418
10_H2	0.002885	0.003098	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
11_H1	0.002273	0.002306	0.002316	0.002525	0.002613	0.002102	0.001744	0.001277	0.002613
11_H2	0.002607	0.002220	0.002008	0.002203	0.002264	0.001864	0.001419	0.000907	0.002607

Min	0.001470	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
Max	0.003339	0.003189	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
Mean	0.002185	0.002368	0.002430	0.002495	0.002465	0.002056	0.001513	0.001017	0.002614
σ	0.000460	0.000430	0.000453	0.000529	0.000556	0.000495	0.000396	0.000261	0.000505
Mean-σ	0.001726	0.001938	0.001977	0.001966	0.001909	0.001561	0.001117	0.000756	0.002108
Mean+σ	0.002645	0.002798	0.002883	0.003024	0.003021	0.002552	0.001910	0.001279	0.003119
Q1	0.001861	0.002040	0.002065	0.002172	0.001985	0.001630	0.001247	0.000829	0.002277
Median	0.002175	0.002261	0.002351	0.002377	0.002394	0.001980	0.001412	0.000993	0.002526
Q3	0.002421	0.002707	0.002662	0.002814	0.002817	0.002384	0.001724	0.001156	0.002988

Table 4.7 IDR results (Bldg: Symmetric – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002193	0.002135	0.002352	0.002194	0.002109	0.001721	0.001404	0.001033	0.002352
1_H2	0.001648	0.002035	0.002375	0.002170	0.001871	0.001600	0.001334	0.000926	0.002375
2_H1	0.003339	0.002795	0.002601	0.002816	0.003089	0.002396	0.001581	0.001042	0.003339
2_H2	0.001954	0.002405	0.002417	0.002415	0.002546	0.002187	0.001520	0.001073	0.002546
3_H1	0.002230	0.002762	0.002982	0.003048	0.002841	0.002452	0.001844	0.001167	0.003048
3_H2	0.001470	0.002002	0.002349	0.002568	0.002567	0.002348	0.001869	0.001190	0.002568
4_H1	0.002505	0.002054	0.002062	0.002103	0.002363	0.001859	0.001269	0.001000	0.002505
4_H2	0.002044	0.002097	0.002252	0.002176	0.001944	0.001568	0.001114	0.000707	0.002252
5_H1	0.001767	0.001984	0.001905	0.001963	0.001935	0.001597	0.001081	0.000745	0.001984
5_H2	0.002310	0.002301	0.002145	0.002339	0.002385	0.001932	0.001192	0.000815	0.002385
6_H1	0.001994	0.002485	0.002490	0.002484	0.002403	0.002027	0.001370	0.000870	0.002490
6_H2	0.001802	0.002109	0.002072	0.002203	0.002208	0.001848	0.001239	0.000767	0.002208
7_H1	0.001831	0.001900	0.001914	0.001806	0.001771	0.001419	0.001025	0.000684	0.001914
7_H2	0.001518	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
8_H1	0.001952	0.002542	0.002682	0.002808	0.002744	0.002335	0.001662	0.000985	0.002808
8_H2	0.002157	0.001972	0.002021	0.001918	0.001845	0.001575	0.001316	0.000902	0.002157
9_H1	0.002392	0.002983	0.003007	0.003137	0.003097	0.002564	0.001970	0.001330	0.003137
9_H2	0.002430	0.003189	0.003326	0.003395	0.003149	0.002495	0.001661	0.001122	0.003395
10_H1	0.002885	0.003098	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
10_H2	0.002779	0.002999	0.003009	0.003329	0.003418	0.002866	0.002139	0.001494	0.003418
11_H1	0.002607	0.002220	0.002008	0.002203	0.002264	0.001864	0.001419	0.000907	0.002607
11_H2	0.002273	0.002306	0.002316	0.002525	0.002613	0.002102	0.001744	0.001277	0.002613

Min	0.001470	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
Max	0.003339	0.003189	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
Mean	0.002185	0.002368	0.002430	0.002495	0.002465	0.002056	0.001513	0.001017	0.002614
σ	0.000460	0.000430	0.000453	0.000529	0.000556	0.000495	0.000396	0.000261	0.000505
Mean-σ	0.001726	0.001938	0.001977	0.001966	0.001909	0.001561	0.001117	0.000756	0.002108
Mean+σ	0.002645	0.002798	0.002883	0.003024	0.003021	0.002552	0.001910	0.001279	0.003119
Q1	0.001861	0.002040	0.002065	0.002172	0.001985	0.001630	0.001247	0.000829	0.002277
Median	0.002175	0.002261	0.002351	0.002377	0.002394	0.001980	0.001412	0.000993	0.002526
Q3	0.002421	0.002707	0.002662	0.002814	0.002817	0.002384	0.001724	0.001156	0.002988

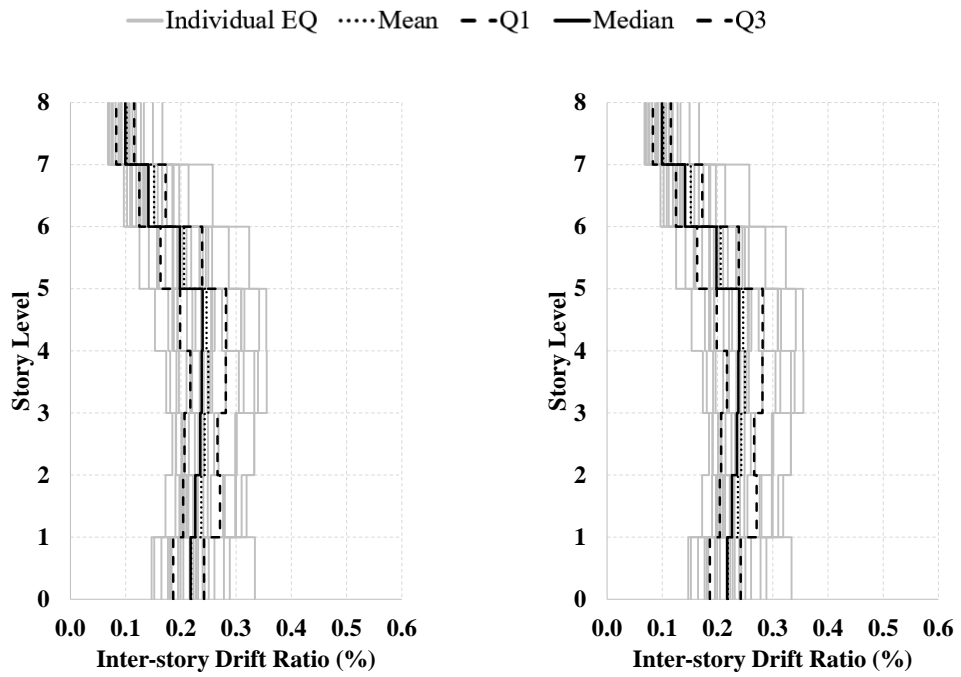


Figure 4.7. IDR profiles for building case “Symmetric” Site Class C

4.3.2 Maximum/Average story displacement (β)

Maximum and average story displacements have been collected for each story as shown in Figure 4.8 and the ratio of maximum to average displacement has been calculated. This ratio has been shown as β and provided for all model sets. Irregular buildings' seismic responses can be observed clearly by examining the variation of this ratio. Most of the codes limit this ratio to avoid the consequences of the torsional effect. The design of buildings with a high irregular ratio is limited for fixed based system by most of the codes. But the same building can be designed with base isolation system and the max β ratio is limited to 1.2. ASCE/SEI 7.22 also limits the fixed based building with torsional irregularity ratio $TIR > 1.4$ but permits for base isolation systems with increasing the design forces of members (ASCE/SEI 7-22, 2021) Chapter 17.2.2.

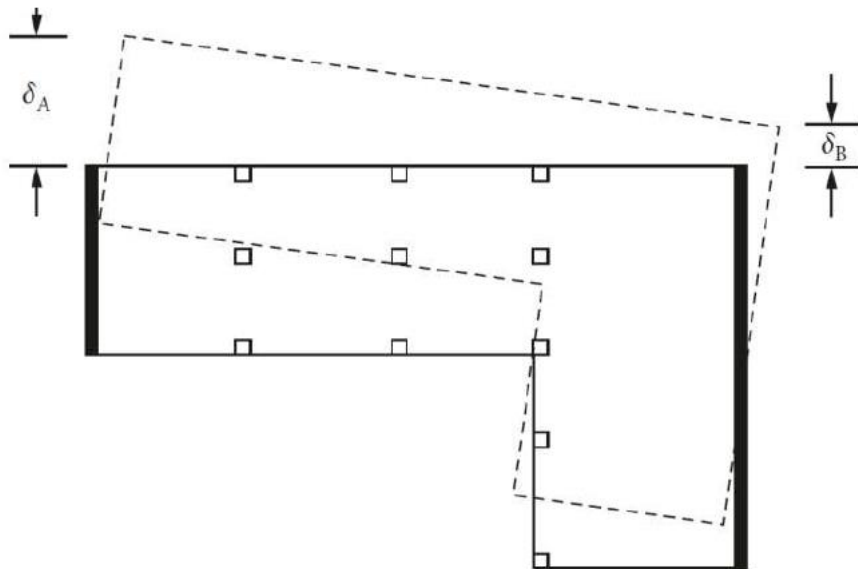


Figure 4.8. Determination of average deflection

4.3.3 Joint drift ratio (JDR)

Joint drift is the lateral displacement of the roof level relative to the isolator level. The joint drift ratio is calculated as the roof drift divided by the building height. For all building JDR values are determined for two joint placed in near the mass center of the building and at the end of the flexible end of the building. Monitored joints are displayed for each geometrical shape in Figure 4.9 and Figure 4.10.

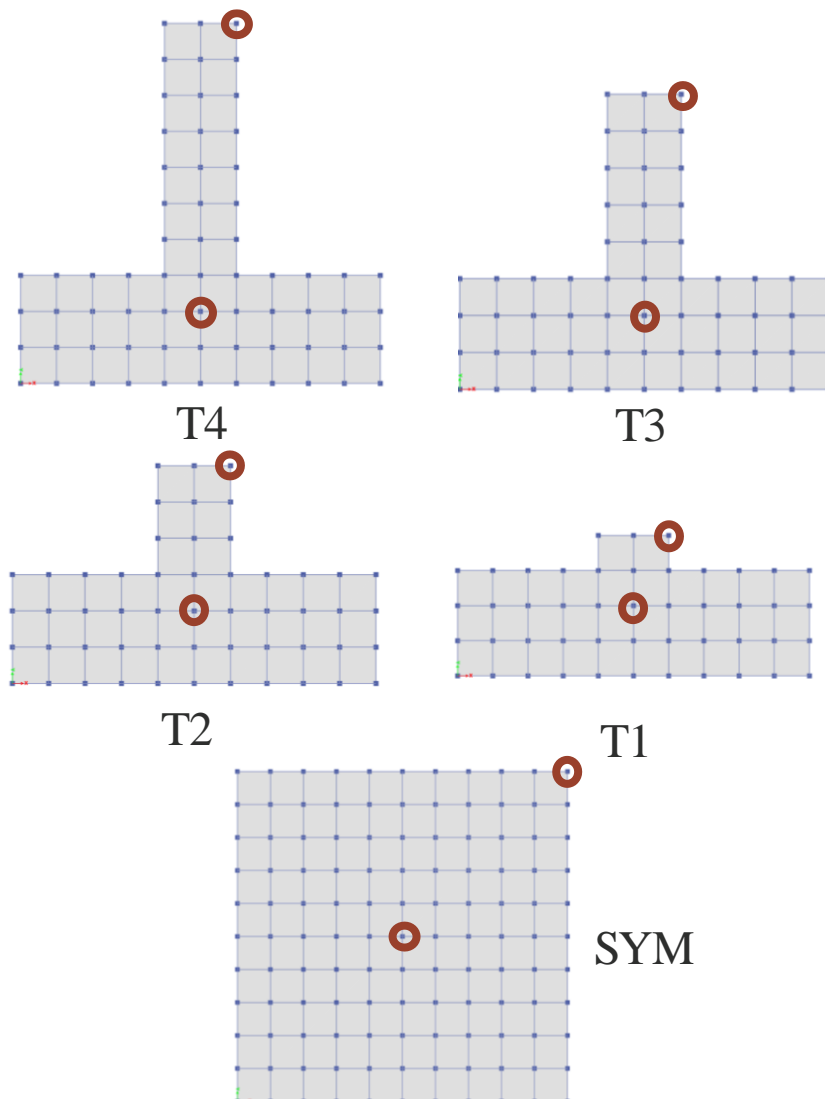


Figure 4.9. Monitored joints for T- and Symmetrical-shaped buildings

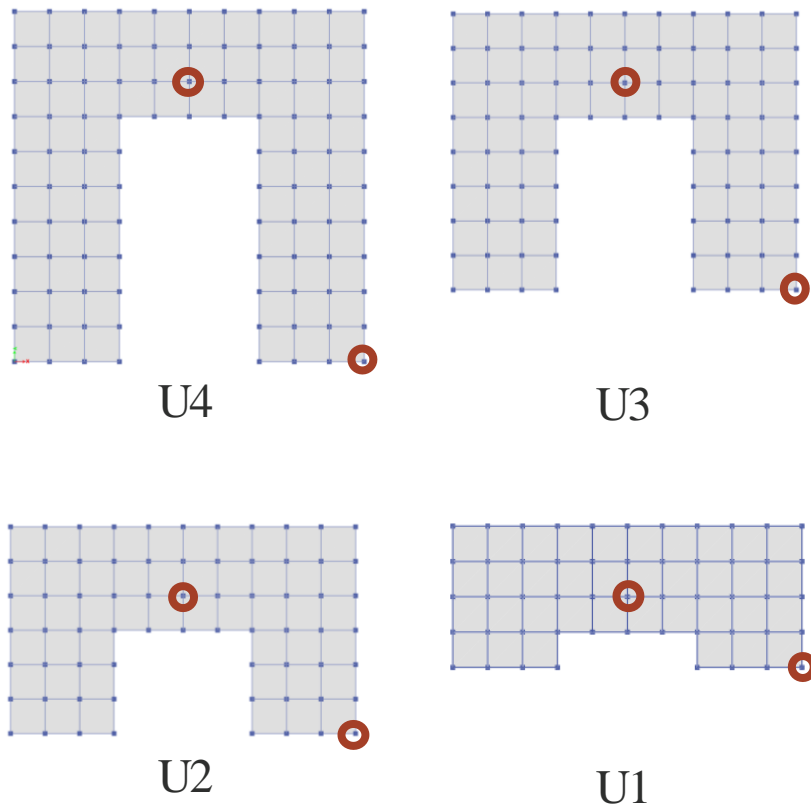


Figure 4.10. Monitored joints for U-shaped buildings

4.3.4 Base shear ratio (BSR)

Base shear ratio (V_s/W) can be defined as the normalization of the total shear force with the seismic weight of the building. V_s is the total unreduced shear force applied above the isolation level and W is the effective seismic weight of the structure above the isolation interface excluding base level. Maximum base shear results of Nonlinear RHA of selected ground motions have been recorded and utilized for the calculation of the base shear ratio. In this study, the lateral loads applied to the building under seismic actions have not been reduced with Reduction Factor R , namely R has been considered as “1” for all structural results. Base shear ratios have been provided for all model sets. ASCE SEI 7.22 code limitations will not be

employed for this study. Base shear ratios have been compared between the buildings with different characteristics and discussions have been presented based on the variation of this ratio. All BSR results have been provided in Appendix A between Table A.85 and Table A.98.

4.3.5 Peak floor acceleration (PFA)

Peak floor acceleration shows the seismic response of each story of the building. PFA results are prepared for each story of all buildings with three different site classes. As an example, the Symmetrical building results in X direction at Site Class C are presented in Table 4.8 and Table 4.9 also show the in Y direction results. All PFA tables have been provided in Appendix A between Table A.99 to Table A.182. Results have been collected from the maximum accelerations in both orthogonal horizontal directions at each time step of selected ground motions. 11 ground motion records with two orthogonal horizontal directions which are a total of 22 records have been performed. In the PFA result table, the first column represents the 22 ground motion names also the first row represents each story name, from bottom to top increasingly. The last column is the maximum floor acceleration (MFA) is collected the maximum floor displacement among all stories for an individual ground motion. The lower part of the table represents the statistical analysis of results. For each story, minimum, maximum, mean, standard deviation, mean- σ and mean+ σ band values, Q1 (lower bound), median and Q3 (upper bound) determined values are presented respectively. In addition, Figure 4.11 display the PFA profiles of the Symmetrical building as a reference. PFA profile graphics of all buildings have been displayed in Appendix B. between Figure A.15 to Figure A.28. The statistical determinations given in the lower part of Table 4.8 and Table 4.9 can be also observed in Figure 4.11.

Table 4.8 PFA results (Bldg: Symmetric – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.981	1.713	1.715	1.594	1.760	1.906	2.365	2.883	2.883
1_H2	2.111	1.830	1.640	1.656	1.660	1.983	2.507	3.031	3.031
2_H1	2.743	2.117	1.897	1.470	2.090	2.164	2.768	3.438	3.438
2_H2	2.608	2.672	2.569	1.918	2.147	2.525	2.818	3.731	3.731
3_H1	2.548	2.292	2.091	1.905	1.829	2.323	3.410	4.201	4.201
3_H2	3.079	2.618	2.026	2.065	2.140	2.702	3.453	4.368	4.368
4_H1	1.915	1.741	1.382	1.429	1.721	2.095	2.214	2.365	2.365
4_H2	2.215	1.949	1.735	1.720	1.860	1.947	2.466	3.064	3.064
5_H1	1.857	1.514	1.362	1.266	1.424	1.883	2.301	2.581	2.581
5_H2	1.698	1.581	1.524	1.253	1.529	1.707	2.070	2.487	2.487
6_H1	1.670	1.549	1.573	1.679	1.699	1.831	2.289	2.784	2.784
6_H2	2.193	2.041	1.880	1.951	2.278	2.271	2.574	3.151	3.151
7_H1	1.573	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
7_H2	1.527	1.531	1.411	1.304	1.527	1.680	1.902	2.320	2.320
8_H1	1.668	1.504	1.813	1.932	1.798	1.720	2.511	3.089	3.089
8_H2	1.991	1.616	1.517	1.479	1.808	2.443	3.157	3.707	3.707
9_H1	3.239	3.717	3.313	2.142	3.017	3.269	3.176	3.908	3.908
9_H2	3.171	3.093	2.516	2.492	2.902	2.917	3.434	4.391	4.391
10_H1	3.053	2.949	2.751	3.082	2.719	3.086	3.903	5.301	5.301
10_H2	2.486	2.335	2.435	2.669	2.685	3.109	4.708	5.981	5.981
11_H1	2.285	2.772	2.434	1.889	2.309	2.462	3.096	4.217	4.217
11_H2	1.906	1.992	1.624	1.621	1.592	1.812	2.504	3.193	3.193

Min	1.527	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
Max	3.239	3.717	3.313	3.082	3.017	3.269	4.708	5.981	5.981
Mean	2.251	2.113	1.928	1.799	1.990	2.244	2.789	3.462	3.462
σ	0.543	0.626	0.535	0.487	0.487	0.512	0.703	0.994	0.994
Mean-σ	1.708	1.488	1.393	1.312	1.502	1.732	2.086	2.468	2.468
Mean+σ	2.793	2.739	2.464	2.286	2.477	2.757	3.491	4.456	4.456
Q1	1.869	1.590	1.536	1.472	1.670	1.844	2.317	2.809	2.809
Median	2.152	1.971	1.774	1.700	1.818	2.130	2.543	3.172	3.172
Q3	2.593	2.547	2.348	1.946	2.245	2.509	3.171	4.128	4.128

Table 4.9 PFA results (Bldg: Symmetric – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.111	1.830	1.640	1.656	1.660	1.983	2.507	3.031	3.031
1_H2	1.981	1.713	1.715	1.594	1.760	1.906	2.365	2.883	2.883
2_H1	2.608	2.672	2.569	1.918	2.147	2.525	2.818	3.731	3.731
2_H2	2.743	2.117	1.897	1.470	2.090	2.164	2.768	3.438	3.438
3_H1	3.079	2.618	2.026	2.065	2.140	2.702	3.453	4.368	4.368
3_H2	2.548	2.292	2.091	1.905	1.829	2.323	3.410	4.201	4.201
4_H1	2.215	1.949	1.735	1.720	1.860	1.947	2.466	3.064	3.064
4_H2	1.915	1.741	1.382	1.429	1.721	2.095	2.214	2.365	2.365
5_H1	1.698	1.581	1.524	1.253	1.529	1.707	2.070	2.487	2.487
5_H2	1.857	1.514	1.362	1.266	1.424	1.883	2.301	2.581	2.581
6_H1	2.193	2.041	1.880	1.951	2.278	2.271	2.574	3.151	3.151
6_H2	1.670	1.549	1.573	1.679	1.699	1.831	2.289	2.784	2.784
7_H1	1.527	1.531	1.411	1.304	1.527	1.680	1.902	2.320	2.320
7_H2	1.573	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
8_H1	1.991	1.616	1.517	1.479	1.808	2.443	3.157	3.707	3.707
8_H2	1.668	1.504	1.813	1.932	1.798	1.720	2.511	3.089	3.089
9_H1	3.171	3.093	2.516	2.492	2.902	2.917	3.434	4.391	4.391
9_H2	3.239	3.717	3.313	2.142	3.017	3.269	3.176	3.908	3.908
10_H1	2.486	2.335	2.435	2.670	2.685	3.109	4.708	5.981	5.981
10_H2	3.053	2.949	2.751	3.082	2.719	3.086	3.903	5.301	5.301
11_H1	1.906	1.992	1.624	1.621	1.592	1.812	2.504	3.193	3.193
11_H2	2.285	2.772	2.434	1.889	2.309	2.462	3.096	4.217	4.217

Min	1.527	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
Max	3.239	3.717	3.313	3.082	3.017	3.269	4.708	5.981	5.981
Mean	2.251	2.113	1.928	1.799	1.990	2.244	2.789	3.462	3.462
σ	0.543	0.626	0.535	0.487	0.487	0.512	0.703	0.994	0.994
Mean-σ	1.708	1.488	1.393	1.312	1.502	1.732	2.086	2.468	2.468
Mean+σ	2.793	2.739	2.464	2.286	2.477	2.757	3.491	4.456	4.456
Q1	1.869	1.590	1.536	1.472	1.670	1.844	2.317	2.809	2.809
Median	2.152	1.971	1.774	1.700	1.818	2.130	2.543	3.172	3.172
Q3	2.593	2.547	2.348	1.946	2.245	2.509	3.171	4.128	4.128

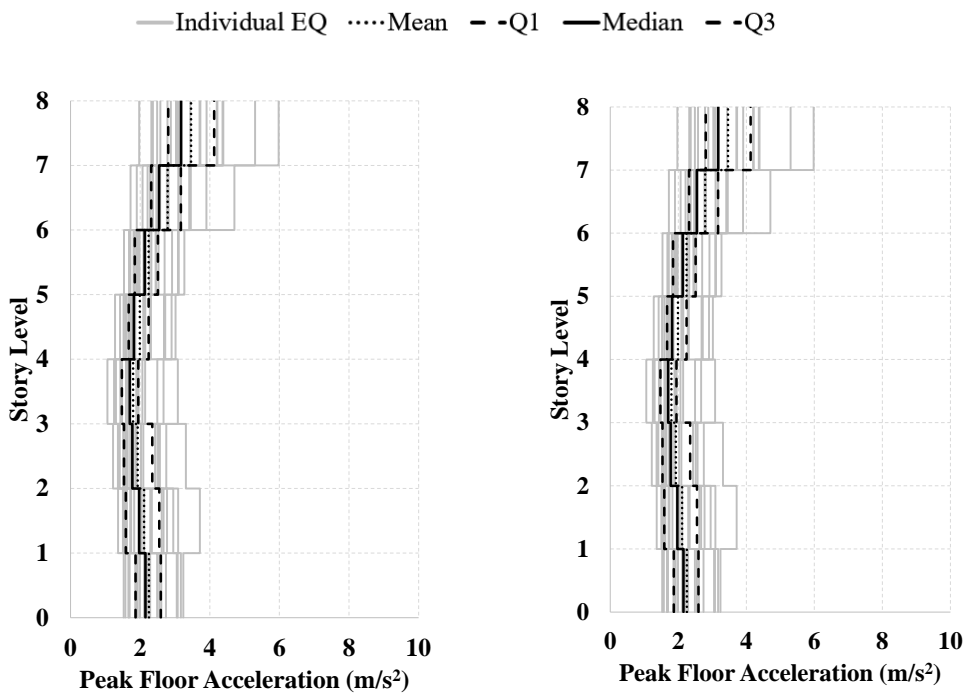


Figure 4.11. PFA profiles for building case “Symmetric” Site Class C

CHAPTER 5

DISCUSSION OF RESULTS

In the scope of this study, the seismic response of buildings with different characteristics has been examined. The evaluation process has been concentrated on the behavior of the superstructure above the base isolation level. Three main aspects have been utilized for the comparative study. First is the plan irregularity ratios variation, second is the mass concentration on the plan and the last issue is the using various isolator groups in isolation system design.

5.1 Evaluation of T-shaped Model Set Results

5.1.1 Interstory drift ratio (IDR)

IDR-based comparisons for T-shaped model set with different site classes have been first made via mean IDR values based profiles presented in Figure 5.1. Symmetrical building results are also included in the figure as a reference.

Considering the X-direction based profiles, mean IDR values tend to increase with increasing irregularity level. However, this is not observed in Y-direction where all T-shaped building responses have a similar pattern. Since the irregularity ratio is varying along Y-direction, structure seismic response is expected to be affected mainly in X-direction. In addition to these observations, IDR demands in both directions tend to increase from Site Class A to Site Class D as expected. The variation in the results has been numerically studied in detail and results are presented building-wise and story-wise in Table 5.1 to Table 5.6. In these comparison tables, mean IDR results and ratios calculated by normalizing the results with T1-based values are tabulated where mean IDR values were computed

considering the results of 22 ground motion records which are presented in Table A.1 to Table A.84 in Appendix A.

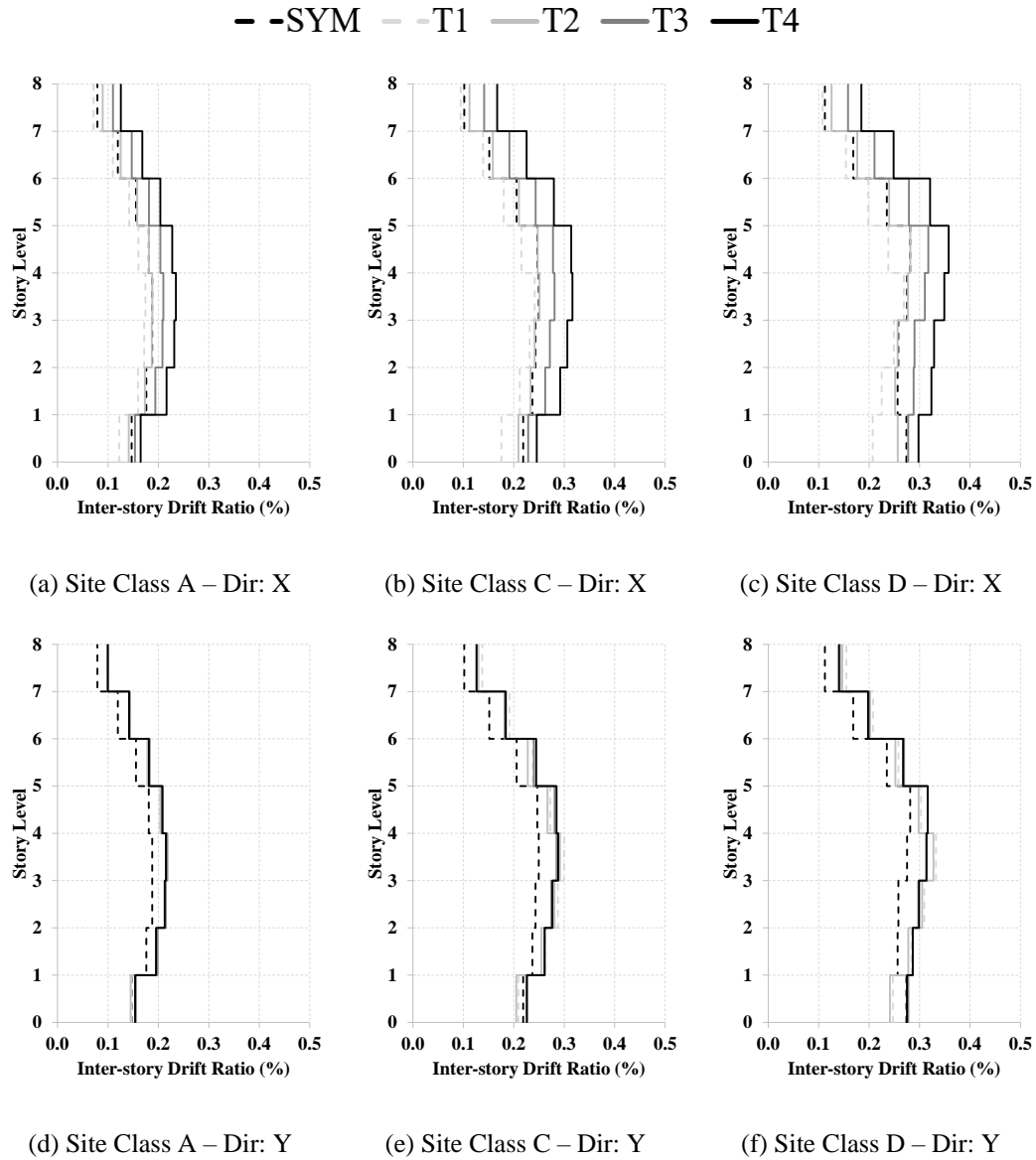


Figure 5.1. Comparison of IDR profiles for T-shaped models

Table 5.1 Comparison of IDR (in %) results for T-shaped models (SC A – Dir: X)

SC A	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.147	0.122	0.141	1.154	0.154	1.255	0.165	1.346
2	0.176	0.160	0.173	1.085	0.194	1.216	0.216	1.355
3	0.188	0.172	0.187	1.087	0.208	1.210	0.231	1.347
4	0.188	0.174	0.188	1.078	0.210	1.204	0.235	1.347
5	0.181	0.160	0.181	1.130	0.204	1.271	0.227	1.419
6	0.156	0.142	0.158	1.112	0.181	1.276	0.204	1.434
7	0.119	0.110	0.125	1.144	0.147	1.343	0.168	1.534
8	0.079	0.071	0.090	1.257	0.110	1.543	0.125	1.762
Min	-	-	-	1.078	-	1.204	-	1.346
Max	-	-	-	1.257	-	1.543	-	1.762
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.194	0.177	0.192	1.085	0.215	1.213	0.239	1.351

Table 5.1 presents the comparison of IDR values for Site Class A in X-direction for T-shaped model set including symmetrical model. Mean IDR values reach the maximum value around Story 4 as mid-height of the building. Mean IDR values of the buildings increase clearly in Story 4 as goes to T1 to T4. Normalized values for each building represent the increasing behavior numerically. Except for Story 8, IDR mean values are increased as 8-15% for building T2, 20-30% for building T3 and 35-50% for T4 according to building T1. MIDR values also verify the increase as 8.5% for building T2, 21% for building T3 and 35% for building T4 with respect to building T1. This determination does not represent the story variation of the compared buildings. The mean IDR value of the stories can vary 10-50% different than the MIDR result. This conceals the IDR increase for individual stories. In addition, MIDR calculations are not sufficient to show the real relations between the buildings, peak values are missed out. At roof level, variation according to T1 reaches the maximum value. As the geometrical irregularity increase from 0.1 to 0.7, T1 to T4, IDR mean values increase 76% for T4 at roof story. Implicitly, determined story drift values involve the torsional contribution.

Table 5.2 Comparison of IDR (in %) results for T-shaped models (SC A – Dir: Y)

SC A	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.147	0.146	0.145	0.989	0.155	1.061	0.154	1.050
2	0.176	0.199	0.196	0.988	0.198	0.998	0.195	0.983
3	0.188	0.214	0.215	1.003	0.214	0.999	0.212	0.991
4	0.188	0.218	0.218	1.002	0.217	0.996	0.215	0.986
5	0.181	0.203	0.204	1.004	0.209	1.031	0.208	1.023
6	0.156	0.179	0.178	0.997	0.183	1.020	0.181	1.012
7	0.119	0.143	0.142	0.997	0.143	1.002	0.142	0.993
8	0.079	0.101	0.100	0.990	0.100	0.988	0.099	0.984
Min	-	-	-	0.988	-	0.988	-	0.983
Max	-	-	-	1.004	-	1.061	-	1.050
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.194	0.220	0.220	1.002	0.221	1.003	0.218	0.993

IDR mean values for Site Class A in Y-direction have been compared in Table 5.2 for T-shaped model set including a symmetrical model. T-shaped structures are symmetrical with respect to Y-axis and the structure has not a flexible end in that direction. It is expected that response in Y direction does not affect the irregularity belonging to the other orthogonal direction. Due to general moment-resisting framing system response, mean IDR values reach the maximum value around Story 4 at mid-height of the building. But mean values decreased slightly in Story 4 as goes to T1 to T4. Maximum normalized values for each building represent a generally slight decrease or nearly close to T1 results. In addition, due to the building response for each story does not represent a large variation, MIDR calculations give a general sight for the relation of building responses. Response in Y direction is different from X direction responses. Increasing mass and irregularity does not result in increasing IDR responses in Y direction. This can be explained as the increasing the inertia of the structure in Y direction from T1 to T4 type.

Table 5.3 Comparison of IDR (in %) results for T-shaped models (SC C – Dir: X)

SC C	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.219	0.175	0.209	1.192	0.228	1.302	0.246	1.400
2	0.237	0.212	0.233	1.102	0.262	1.239	0.292	1.380
3	0.243	0.231	0.241	1.043	0.272	1.174	0.306	1.322
4	0.249	0.241	0.251	1.040	0.281	1.164	0.316	1.311
5	0.247	0.215	0.247	1.151	0.278	1.292	0.314	1.460
6	0.206	0.180	0.210	1.169	0.243	1.352	0.279	1.553
7	0.151	0.139	0.158	1.140	0.191	1.376	0.226	1.623
8	0.102	0.095	0.112	1.186	0.141	1.493	0.167	1.766
Min	-	-	-	1.040	-	1.164	-	1.311
Max	-	-	-	1.192	-	1.493	-	1.766
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.261	0.242	0.258	1.066	0.288	1.187	0.323	1.331

Table 5.3 presents the IDR results in X-direction for Site Class C. Mean IDR values reach the maximum value around the Story 4 similarly Site Class A responses mentioned above. Mean values of each building increase clearly at Story 4 as goes to type T1 to T4 also as geometric irregularity plan ratio goes to 0.1 to 0.7. Normalized values for each building represent the increasing behavior numerically. Except for Story 8, IDR mean values are increased as 4-15% for building T2, 16-35% for building T3 and 30-60% for T4 according to building T1. MIDR values also verify the increase as 7% for building T2, 18% for building T3 and 32% according to building T1. This determination does not represent the story variation of the compared buildings. The mean IDR value of the stories can vary 10-50% different than the MIDR result. At roof level, IDR normalized ratio with respect to T1 building results reaches the maximum value. As the geometrical irregularity increase from 0.1 to 0.7, T1 to T4, IDR mean values increase 76% for T4 at roof story as also similar with Site Class A observation.

Table 5.4 Comparison of IDR (in %) results for T-shaped models (SC C – Dir: Y)

SC C	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.219	0.209	0.205	0.980	0.227	1.083	0.226	1.079
2	0.237	0.262	0.255	0.974	0.260	0.996	0.261	1.000
3	0.243	0.288	0.281	0.975	0.274	0.954	0.277	0.962
4	0.249	0.300	0.292	0.972	0.285	0.949	0.288	0.960
5	0.247	0.272	0.267	0.979	0.281	1.031	0.285	1.045
6	0.206	0.238	0.228	0.958	0.240	1.009	0.244	1.029
7	0.151	0.191	0.182	0.950	0.182	0.952	0.184	0.963
8	0.102	0.137	0.130	0.944	0.126	0.921	0.126	0.917
Min	-	-	-	0.944	-	0.921	-	0.917
Max	-	-	-	0.980	-	1.083	-	1.079
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.261	0.301	0.293	0.974	0.291	0.966	0.294	0.978

Table 5.4 presents the results of IDR results in Y-direction for Site Class C. Due to general moment-resisting framing system response, mean IDR values reach the maximum value around Story 4 at mid-height of the building. But a small amount of decrease in IDR values is observed as goes from T1 to T4. Maximum normalized values for each building represent a general slight decrease or so close to T1 results. In addition, due to the building response for each story does not represent a large variation, MIDR calculations give a general sight for the relation of building responses. Response in Y-direction is different from X direction responses. Increasing mass and irregularity does not result in increasing IDR responses in Y-direction. This can be explained as the increasing the inertia of the structure in Y-direction from T1 to T4 type. Due to the symmetry axis lying along the Y-axis, it is expected that response in Y-direction does not affect the irregularity belonging to the other orthogonal direction.

Table 5.5 Comparison of IDR (in %) results for T-shaped models (SC D – Dir: X)

SC D	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.274	0.207	0.257	1.241	0.277	1.340	0.298	1.439
2	0.257	0.225	0.252	1.118	0.288	1.281	0.324	1.438
3	0.258	0.249	0.256	1.030	0.290	1.165	0.329	1.321
4	0.275	0.269	0.277	1.031	0.311	1.156	0.349	1.299
5	0.281	0.238	0.282	1.184	0.317	1.333	0.358	1.503
6	0.235	0.198	0.240	1.209	0.279	1.408	0.321	1.618
7	0.169	0.154	0.176	1.146	0.211	1.368	0.249	1.615
8	0.112	0.108	0.126	1.163	0.158	1.465	0.185	1.711
Min	-	-	-	1.030	-	1.156	-	1.299
Max	-	-	-	1.241	-	1.465	-	1.711
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.312	0.269	0.301	1.119	0.335	1.245	0.372	1.381

Table 5.6 Comparison of IDR (in %) results for T-shaped models (SC D – Dir: Y)

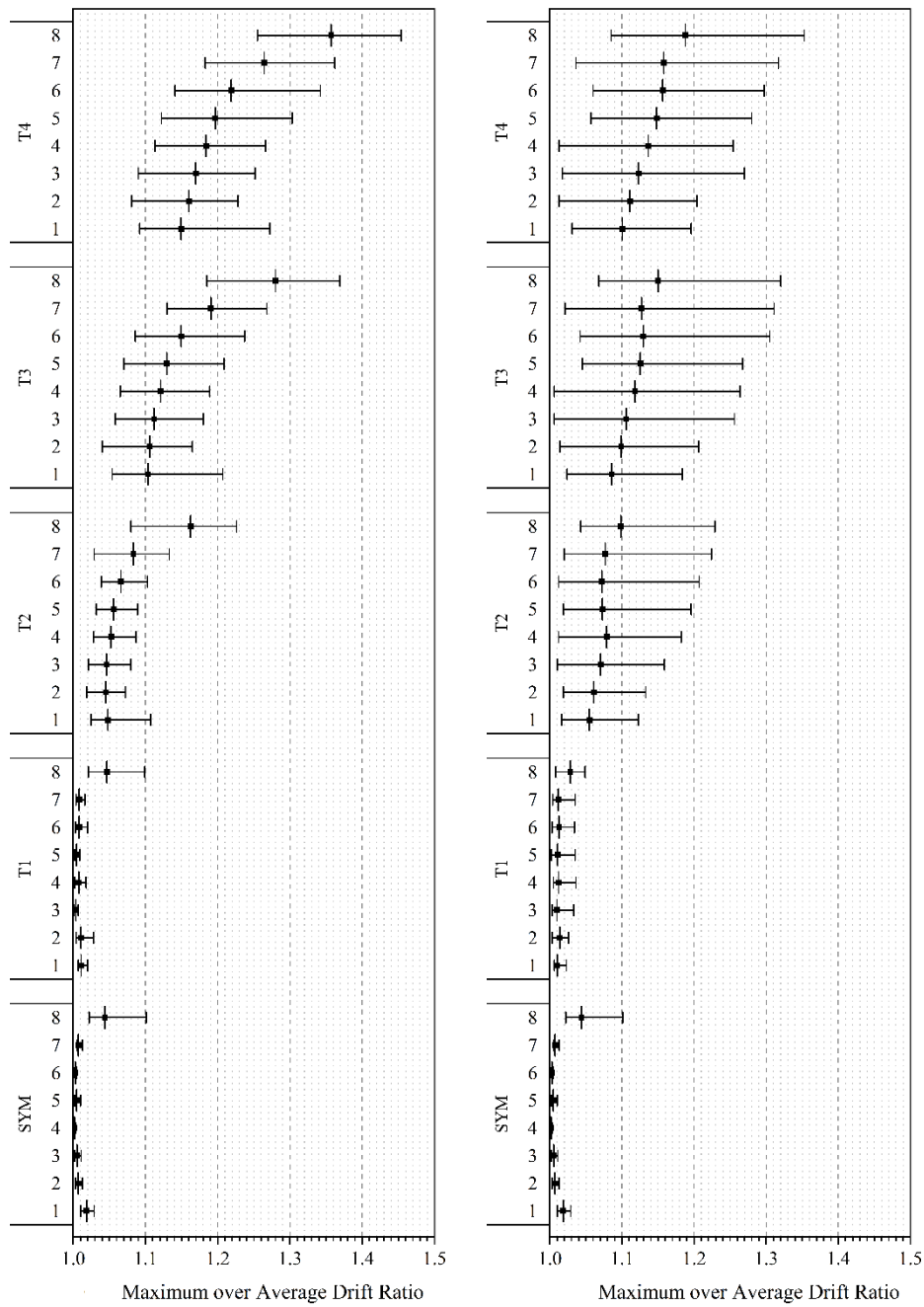
SC D	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	0.274	0.247	0.241	0.976	0.278	1.124	0.275	1.112
2	0.257	0.284	0.278	0.977	0.287	1.009	0.286	1.008
3	0.258	0.309	0.305	0.987	0.297	0.962	0.299	0.966
4	0.275	0.333	0.327	0.984	0.313	0.942	0.314	0.944
5	0.281	0.303	0.298	0.984	0.317	1.045	0.316	1.043
6	0.235	0.258	0.252	0.977	0.269	1.044	0.267	1.036
7	0.169	0.208	0.202	0.971	0.200	0.962	0.198	0.952
8	0.112	0.155	0.147	0.947	0.142	0.916	0.140	0.904
Min	-	-	-	0.947	-	0.916	-	0.904
Max	-	-	-	0.987	-	1.124	-	1.112
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MIDR	0.312	0.333	0.328	0.984	0.338	1.014	0.337	1.013

Table 5.5 presents, the IDR results of Site Class D in X-direction, showing a similar pattern with Site Class A and Site Class C. Mean IDR values reaches the maximum value around Story 4 and increase as goes from type T1 to T4 building. All normalized ratios also represent this increasing trend. Except for Story 8, IDR mean values are increased as 3-20% for building T2 with various patterns in stories, 15-40% for building T3 and 30-60% for T4 according to building T1. MIDR values also verify the increase as 12% for building T2, 25% for building T3 and 38% for T4 according to building T1. This determination does not represent the story variation of the compared buildings. The mean IDR value of the stories can vary 10-50% different than the MIDR result. At roof story, IDR mean values increase 70% for T4 with respect to T1 which is also similar with Site Class A and C observations.

Also, Table 5.6 presents IDR responses in Y-direction for Site Class D. Results of all buildings in T-shaped model set tends to decrease in a small amount or they are close to each other as goes from T1 to T4 building which has increasing irregularity and mass. T-shaped buildings are symmetrical with respect to Y-direction. The structure has not the flexible ends in Y-direction, so irregularity does not change in that direction. Therefore, the irregularity effect does not appear in the Y-direction responses. This consequence also stems from the increasing rigidity in that direction. Regarding the site class variation aspect, the values of mean IDR values apparently increase with going from Site Class A to Site Class D as expected. Mean IDR values increase approximately 40% from Site Class A to Site Class D.

5.1.2 Maximum/Average story displacement (β)

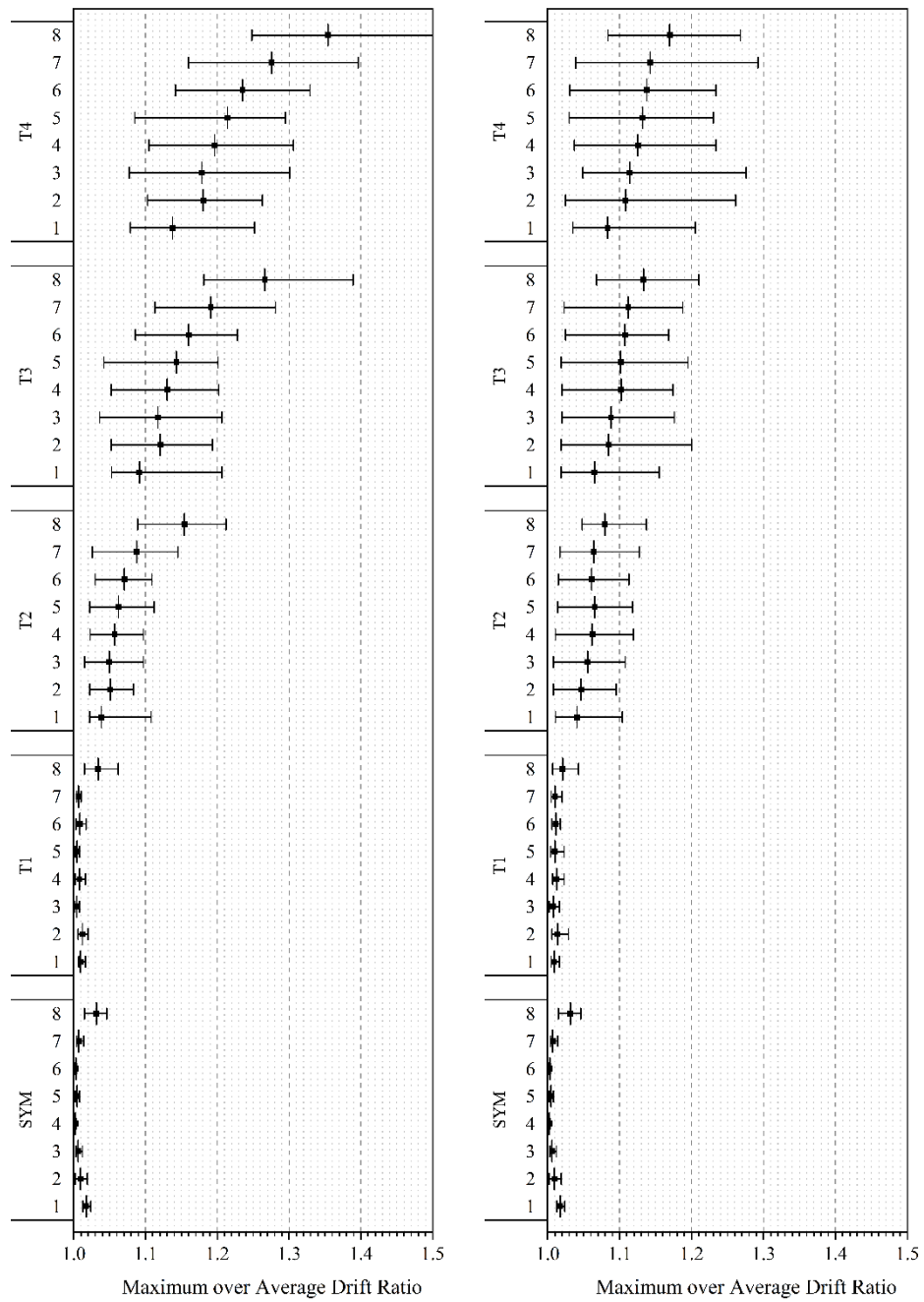
Maximum displacement over average displacement ratio of each story of T-shaped model set has been presented in Figure 5.2, Figure 5.3 and Figure 5.4 for Site Class A, Site Class C and Site Class D respectively. The symmetrical building is also included as a reference. Maximum and average values are determined for 22 ground motion records. Results have been presented the mean and maximum-minimum boundary values as a band. The results present that the building has a higher geometrical irregularity ratio has also a higher β ratio. For the symmetrical building, β value is the minimum but for the building with the maximum irregularity which is T4, β reaches almost 1.5 at some points. Results in stories for all building tends to increase approaching the upper stories and reach the maximum value at the roof story. In addition, the band width distance between the upper and lower bound increase as increasing story level and also increase with the higher irregularity ratio. Band with reaches the maximum value at the roof level for all buildings. T4 has the maximum band width compared to other buildings. Also, it can be observed that when the irregularity ratio increases from T1 to T4, as 0.1 to 0.7, β ratio reaches approximately 1.3 at the roof story in X-direction. At first story β ratio increases approximately 1.15. This value also depends on the mass and stiffness of the wings of the building. β ratio provides an observation about the flexibility of the related story and the whole building. Similarly, in Y-direction β values display the same increasing pattern as X-direction results. But mean values of β for each story and each building in Y-direction is less than the results for X-direction. On the other hand, band width in Y-direction is much higher for each case. All observations are mainly valid for each site class.



(a) X-direction

(b) Y-direction

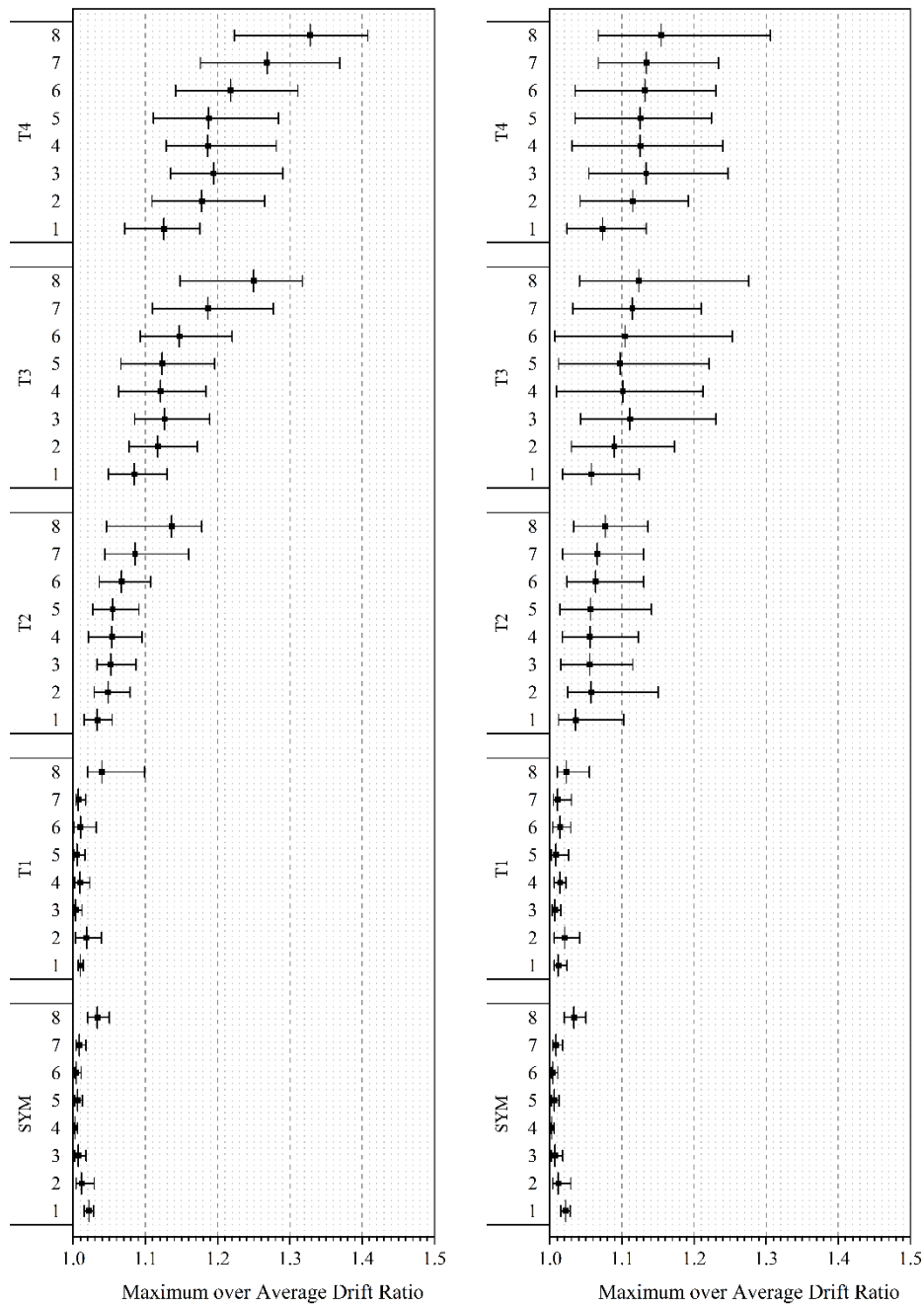
Figure 5.2. Variation of maximum drift to average drift ratios for T-shaped models
(Site Class A)



(a) X-direction

(b) Y-direction

Figure 5.3. Variation of maximum drift to average drift ratios for T-shaped models
(Site Class C)



(a) X-direction

(b) Y-direction

Figure 5.4. Variation of maximum drift to average drift ratios for T-shaped models
(Site Class D)

5.1.3 Joint drift ratio (JDR)

The joint drift ratios for the T-shaped building set are provided in Table 5.7. Monitored two joints' JDR values are given in both directions, U1 and U2, as X and Y-direction respectively. The first joint is located near the center of mass and intersection of the wings (Center) and the second joint is located at the flexible end of the building (Flexible End). Monitored joint plan locations are displayed in Figure 4.9 and also joint drift is calculated between the roof (Story 8) and isolator level. Normalized JDR values are shown in Table 5.8. JDR values of T2, T3 and T4 buildings are normalized with T1 JDR values.

At the flexible end joint, in X-direction (U1), as geometric plan irregularity ratio increase (from T1 to T4) JDR increase approximately 45%. For Site Class A, for T4, 43%, for Site Class C 44% and Site Class D 47% increase are observed. But at the center joint, as the geometric plan irregularity ratio increase (from T1 to T4) JDR increase approximately 5%. On the other hand, in Y-direction (U2), as geometric plan irregularity ratio increase (from T1 to T4) JDR decrease approximately 15% for both two joints. In addition, as site class characteristics get worse, JDR values tend to increase for each building in both directions.

Table 5.7 Comparison of JDR results for T-shaped models

	CENTER U1			CENTER U2			FLEXIBLE END U1			FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
SYM	0.146	0.193	0.216	0.148	0.201	0.207	0.156	0.200	0.199	0.161	0.196	0.160
T1	0.133	0.179	0.197	0.169	0.228	0.252	0.133	0.179	0.197	0.169	0.228	0.252
T2	0.139	0.185	0.204	0.160	0.213	0.236	0.149	0.199	0.223	0.159	0.212	0.237
T3	0.141	0.187	0.207	0.153	0.203	0.226	0.170	0.228	0.256	0.152	0.203	0.226
T4	0.141	0.187	0.206	0.148	0.196	0.219	0.190	0.259	0.290	0.147	0.195	0.218

Table 5.8 Comparison of normalized JDR results for T-shaped models

	NORMALIZED CENTER U1			NORMALIZED CENTER U2			NORMALIZED FLEXIBLE END U1			NORMALIZED FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
T1	-	-	-	-	-	-	-	-	-	-	-	-
T2	1.043	1.033	1.039	0.945	0.934	0.938	1.122	1.112	1.128	0.943	0.932	0.938
T3	1.061	1.045	1.053	0.905	0.893	0.897	1.274	1.271	1.295	0.902	0.890	0.896
T4	1.061	1.045	1.045	0.876	0.862	0.867	1.428	1.443	1.470	0.872	0.859	0.863

5.1.4 Base shear ratio (BSR)

Base shear ratio of T-shaped model set has been provided in Table 5.9. The calculation of base shear ratio has been given in Chapter 4.3.4. Square symmetrical model results have also been given as a reference. For T-shaped model set, it can be observed that the base shear ratio does not show any significant changes with the variation of irregularity ratio changes. Different ground motions create different base shear ratios but for each site class similar BRS responses can be monitored within the T-shaped model set. In addition, from the close observation of fundamental mode shapes, excessive localized deformation in members placed near the flexible side of the plan geometry of the structures are observed. This may increase the vulnerability of such structures.

Table 5.9 Comparison of BSR results for T-shaped models

SITE CLASS	BLDG DIR	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
A	X	0.077	0.078	0.078	0.996	0.077	0.995	0.077	0.992
	Y	0.077	0.077	0.077	1.002	0.077	1.002	0.077	1.001
C	X	0.096	0.097	0.097	0.997	0.097	0.996	0.096	0.993
	Y	0.096	0.097	0.097	1.001	0.096	0.999	0.096	0.999
D	X	0.115	0.115	0.115	0.996	0.115	0.994	0.115	0.993
	Y	0.115	0.116	0.116	0.997	0.115	0.992	0.115	0.990

Fixed based and base isolated building BSR values for all buildings and site classes have been given simultaneously in Table 5.10, Table 5.11 and Table 5.12. It is clear that the building with seismic isolator system have the smaller base shear ratio according to fixed base system. The ratio of the BSR values of isolated building to fixed base building is approximately 0.22, 0.14 and 0.16 for Site Class A, Site Class B and Site Class D, respectively. However, it is not observed any variation pattern based on the building irregularity ratio. Because isolator systems for all buildings have been designed as same target period and same target displacement even though all have different superstructure masses and stiffness.

Table 5.10 Comparison of BSR results for all modal sets and Site Class A

BLDG	Site Class A					
	BSR-X			BSR-Y		
	Isolated	Fixed	Ratio	Isolated	Fixed	Ratio
SYM	0.077	0.344	0.225	0.077	0.344	0.225
T1	0.078	0.349	0.223	0.077	0.346	0.223
T2	0.078	0.346	0.224	0.077	0.345	0.224
T3	0.077	0.343	0.226	0.077	0.345	0.224
T4	0.077	0.341	0.226	0.077	0.345	0.224
U1	0.080	0.348	0.229	0.080	0.345	0.230
U2	0.080	0.344	0.232	0.080	0.345	0.231
U3	0.080	0.344	0.231	0.080	0.345	0.231
U4	0.080	0.344	0.231	0.080	0.346	0.231
SYMM	0.077	0.343	0.226	0.077	0.343	0.226
T4M	0.077	0.344	0.225	0.077	0.336	0.230
U4M	0.080	0.342	0.233	0.080	0.346	0.231
U4GR1	0.080	0.344	0.231	0.080	0.346	0.230
U4GR5	0.080	0.344	0.233	0.080	0.346	0.232

Table 5.11 Comparison of BSR results for all modal sets and Site Class C

BLDG	Site Class C					
	BSR-X			BSR-Y		
	Isolated	Fixed	Ratio	Isolated	Fixed	Ratio
SYM	0.096	0.694	0.139	0.096	0.694	0.139
T1	0.097	0.738	0.132	0.097	0.680	0.142
T2	0.097	0.726	0.133	0.097	0.694	0.139
T3	0.097	0.712	0.136	0.096	0.704	0.137
T4	0.096	0.700	0.138	0.096	0.712	0.135
U1	0.101	0.734	0.138	0.101	0.693	0.145
U2	0.101	0.715	0.141	0.101	0.710	0.142
U3	0.101	0.703	0.144	0.101	0.719	0.140
U4	0.101	0.694	0.145	0.101	0.725	0.139
SYMM	0.096	0.688	0.140	0.096	0.688	0.140
T4M	0.096	0.711	0.135	0.096	0.687	0.140
U4M	0.101	0.685	0.147	0.101	0.723	0.140
U4GR1	0.101	0.694	0.145	0.101	0.725	0.139
U4GR5	0.101	0.694	0.146	0.102	0.725	0.140

Table 5.12 Comparison of BSR results for all modal sets and Site Class D

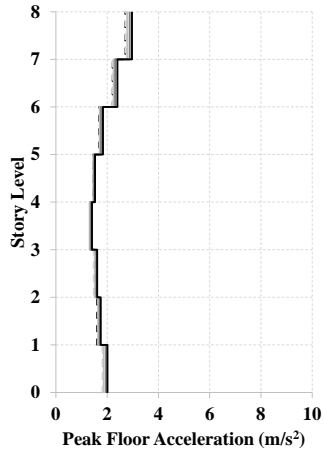
BLDG	Site Class D					
	BSR-X			BSR-Y		
	Isolated	Fixed	Ratio	Isolated	Fixed	Ratio
SYM	0.115	0.749	0.153	0.115	0.749	0.153
T1	0.115	0.747	0.155	0.116	0.746	0.155
T2	0.115	0.748	0.154	0.116	0.749	0.154
T3	0.115	0.744	0.154	0.115	0.752	0.153
T4	0.115	0.736	0.156	0.115	0.753	0.153
U1	0.124	0.747	0.166	0.125	0.748	0.166
U2	0.124	0.750	0.165	0.124	0.752	0.165
U3	0.124	0.748	0.166	0.124	0.751	0.165
U4	0.124	0.745	0.167	0.124	0.749	0.166
SYMM	0.115	0.740	0.155	0.115	0.740	0.155
T4M	0.115	0.753	0.152	0.115	0.725	0.158
U4M	0.124	0.734	0.169	0.124	0.744	0.167
U4GR1	0.124	0.745	0.167	0.123	0.749	0.165
U4GR5	0.125	0.745	0.168	0.125	0.749	0.167

5.1.5 Peak floor acceleration (PFA)

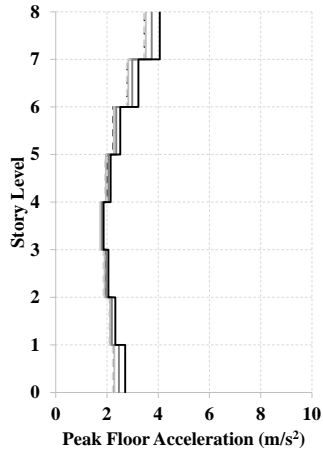
PFA-based profiles for T-shaped model set with different site classes have been presented in Figure 5.1. Symmetrical building results are also included in the figure as a reference. Considering the X-direction based profiles, mean PFA values tend to slightly increase with increasing irregularity level. Especially at the roof level, PFA variation becomes more clear between the buildings in the model set. However, this observation is not valid for Y-direction where all T-shaped building responses have a similar pattern and does not show significant variation between the buildings. Since the irregularity ratio is varying along Y-direction, structure seismic response is expected to be affected mainly in X-direction. In addition to these observations, PFA demands in both directions tend to increase from Site Class A to Site Class D as expected.

Peak floor acceleration responses of T-shaped model set for the three different site classes are presented in between Table 5.13 and Table 5.18. It is observed that the story acceleration increases as the Type T1 goes to Type T4. In model T-shaped model set T4 has the maximum mass and maximum irregularity ratio. Increasing in story acceleration mainly depends on the increase in mass of the buildings but additionally, irregularity ratio contributes to the PFA results especially roof responses therefore variation between the buildings can be observed. As expected, PFA results in both directions tend to increase from Site Class A to Site Class D, therefore all buildings have higher story acceleration at site class D and minimum story acceleration at Site Class A. The variation in the results has been numerically studied in detail and results are presented building-wise and story-wise in Table 5.13 and Table 5.18. In these comparison tables, mean PFA results and ratios calculated by normalizing the results with T1-based values are tabulated where mean PFA values were computed considering the results of 22 ground motion records which are presented in Table A.99 to Table A.128 in Appendix A

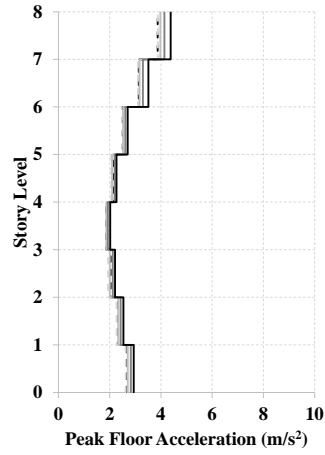
--SYM --T1 —T2 —T3 —T4



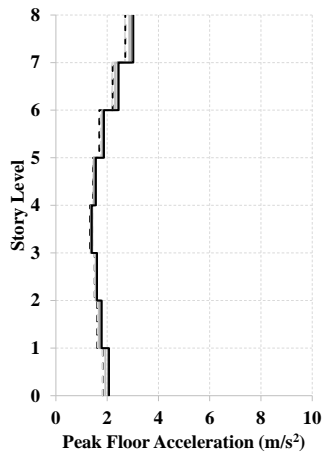
(a) Site Class A – Dir: X



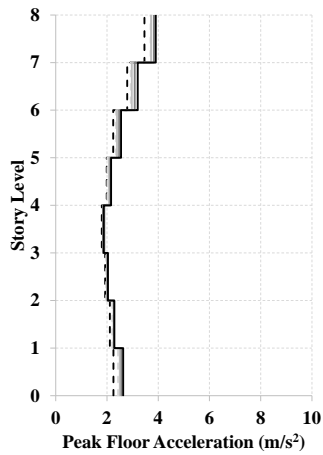
(b) Site Class C – Dir: X



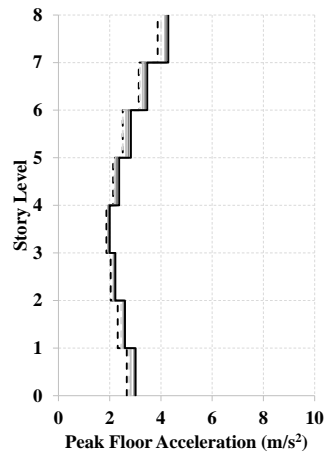
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure 5.5. Comparison of PFA profiles for T-shaped models

Table 5.13 presents the comparison of PFA values for Site Class A in X-direction for T-shaped model set including symmetrical model. Mean PFA values decrease to the minimum value around Story 4 at mid-height of the building. However, mean PFA values of the buildings slightly increase in Story 4 as goes from T1 to T4. All normalized values show the slight increasing pattern. PFA mean values increase 3% for building T2, 5% for T3 and 7% for T4 according to building T1. This determination does not represent the story variation of the compared buildings. The normalized value of the stories can vary as 0.97-1.092 for T2, 0.96-1.12 for T3 and 1.041-1.098 for T4 building.

PFA values for Site Class A in Y-direction have been compared and presented in Table 5.14 for T-shaped model set including the symmetrical model. Mean PFA values reach the maximum value around Story 4 in the mid-height of the building as similar to X-direction response. But mean values decreased slightly or close to each other as goes from T1 to T4. However maximum normalized values for each building represent a generally slight increase or close to T1 results. In addition, the story does not represent a large variation, MIDR calculations give a general sight for the relation of building responses. Response in Y direction is not significantly different from X-direction responses. Increasing mass and irregularity does not result in increasing PFA responses in Y direction.

The increasing pattern of PFA responses in X-direction become more visible from Site Class A to Site Class C which is presented in Table 5.15 to Table 5.18. But in Y-direction even though the PFA mean values increase with the site classes, the normalized ratio of each building does not significantly change.

Table 5.13 Comparison of PFA results for T-shaped models (SC A – Dir: X)

SC A	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	1.834	1.830	1.868	1.021	1.955	1.068	2.010	1.098
2	1.609	1.655	1.648	0.995	1.705	1.030	1.751	1.058
3	1.515	1.474	1.516	1.029	1.577	1.070	1.611	1.093
4	1.334	1.354	1.315	0.971	1.361	1.005	1.409	1.041
5	1.453	1.455	1.458	1.002	1.492	1.025	1.527	1.049
6	1.693	1.733	1.709	0.986	1.763	1.018	1.837	1.060
7	2.215	2.203	2.250	1.021	2.313	1.050	2.400	1.089
8	2.706	2.713	2.787	1.027	2.879	1.061	2.971	1.095
Min	-	-	-	0.971	-	1.005	-	1.041
Max	-	-	-	1.029	-	1.070	-	1.098
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	2.706	2.713	2.787	1.027	2.879	1.061	2.971	1.095

Table 5.14 Comparison of PFA results for T-shaped models (SC A – Dir: Y)

SC A	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	1.834	1.819	1.927	1.059	2.038	1.120	2.074	1.141
2	1.609	1.632	1.677	1.028	1.741	1.067	1.788	1.096
3	1.515	1.520	1.555	1.023	1.588	1.045	1.604	1.056
4	1.334	1.426	1.420	0.996	1.366	0.958	1.401	0.983
5	1.453	1.459	1.477	1.012	1.515	1.038	1.564	1.071
6	1.693	1.748	1.808	1.034	1.843	1.054	1.878	1.074
7	2.215	2.194	2.310	1.053	2.409	1.098	2.450	1.117
8	2.706	2.692	2.863	1.064	2.952	1.097	3.019	1.121
Min	-	-	-	0.996	-	0.958	-	0.983
Max	-	-	-	1.064	-	1.120	-	1.141
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	2.706	2.697	2.863	1.062	2.952	1.095	3.019	1.120

Table 5.15 Comparison of PFA results for T-shaped models (SC C – Dir: X)

SC C	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	2.251	2.225	2.285	1.027	2.466	1.109	2.709	1.218
2	2.113	2.116	2.121	1.003	2.192	1.036	2.328	1.100
3	1.928	1.861	1.906	1.024	1.971	1.059	2.056	1.105
4	1.799	1.796	1.740	0.969	1.806	1.006	1.869	1.041
5	1.990	1.923	1.955	1.017	2.058	1.070	2.141	1.113
6	2.244	2.262	2.270	1.004	2.363	1.045	2.517	1.113
7	2.789	2.774	2.835	1.022	2.988	1.077	3.225	1.163
8	3.462	3.447	3.516	1.020	3.747	1.087	4.062	1.179
Min	-	-	-	0.969	-	1.006	-	1.041
Max	-	-	-	1.027	-	1.109	-	1.218
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	3.462	3.447	3.516	1.020	3.747	1.087	4.062	1.179

Table 5.16 Comparison of PFA results for T-shaped models (SC C – Dir: Y)

SC C	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	2.251	2.433	2.502	1.029	2.568	1.056	2.631	1.081
2	2.113	2.209	2.257	1.022	2.279	1.031	2.286	1.035
3	1.928	1.968	1.998	1.015	2.018	1.025	2.038	1.035
4	1.799	1.889	1.905	1.009	1.842	0.975	1.878	0.994
5	1.990	2.015	2.080	1.032	2.136	1.060	2.161	1.072
6	2.244	2.353	2.393	1.017	2.474	1.052	2.551	1.084
7	2.789	2.929	2.970	1.014	3.082	1.052	3.200	1.092
8	3.462	3.704	3.720	1.004	3.828	1.033	3.905	1.054
Min	-	-	-	1.004	-	0.975	-	0.994
Max	-	-	-	1.032	-	1.060	-	1.092
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	3.462	3.704	3.720	1.004	3.828	1.033	3.905	1.054

Table 5.17 Comparison of PFA results for T-shaped models (SC D – Dir: X)

SC D	SYM	T1	T2		T3		T4	
X	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	2.669	2.623	2.706	1.032	2.823	1.076	2.939	1.120
2	2.313	2.267	2.329	1.028	2.428	1.071	2.536	1.119
3	2.036	1.932	2.002	1.036	2.120	1.097	2.206	1.142
4	1.872	1.918	1.869	0.974	1.927	1.005	2.021	1.054
5	2.135	2.059	2.093	1.016	2.196	1.067	2.266	1.100
6	2.511	2.518	2.522	1.001	2.611	1.037	2.700	1.072
7	3.133	3.102	3.167	1.021	3.297	1.063	3.509	1.131
8	3.875	3.880	3.977	1.025	4.135	1.066	4.382	1.129
Min	-	-	-	0.974	-	1.005	-	1.054
Max	-	-	-	1.036	-	1.097	-	1.142
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	3.875	3.880	3.977	1.025	4.135	1.066	4.382	1.129

Table 5.18 Comparison of PFA results for T-shaped models (SC D – Dir: Y)

SC D	SYM	T1	T2		T3		T4	
Y	Mean	Mean	Mean	T2/T1	Mean	T3/T1	Mean	T4/T1
1	2.669	2.753	2.821	1.025	2.960	1.075	3.014	1.095
2	2.313	2.449	2.523	1.030	2.568	1.048	2.596	1.060
3	2.036	2.144	2.153	1.004	2.187	1.020	2.220	1.036
4	1.872	1.974	1.969	0.997	1.952	0.989	2.003	1.015
5	2.135	2.186	2.226	1.018	2.289	1.047	2.371	1.085
6	2.511	2.515	2.642	1.051	2.735	1.088	2.830	1.125
7	3.133	3.184	3.291	1.034	3.387	1.064	3.467	1.089
8	3.875	4.010	4.159	1.037	4.214	1.051	4.290	1.070
Min	-	-	-	0.997	-	0.989	-	1.015
Max	-	-	-	1.051	-	1.088	-	1.125
	SYM	T1	T2	T2/T1	T3	T3/T1	T4	T4/T1
MFA	3.875	4.010	4.159	1.037	4.214	1.051	4.290	1.070

Isolation systems of all buildings have been designed considering the same target period and target displacement. Therefore, all buildings have almost the same period with various masses and the base shear ratio of the buildings for a specific site class is also the same as mentioned in 5.1.4. The buildings with the same BSR also have nearly close story accelerations. The differences results from the mass difference between the interested buildings. Irregularity contribution on PFA values can be observed from the roof floor acceleration and normalized results. Increasing pattern of PFA for building from T1 to T4 become visible with Site Class A to Site Class D. Maximum normalized PFA value for T4 can reach nearly 1.2 in X-direction but this increasing pattern in normalized values is not observed in Y-direction. PFA values increase as from Site Class A to Site Class D but normalized results do not significantly change. Increasing mass and X-direction irregularity does not result in significant increasing PFA responses in Y direction. This can be explained as the increasing the inertia of the structure in Y direction from T1 to T4 type.

5.2 Evaluation of U-shaped Model Set Results

5.2.1 Interstory drift ratio (IDR)

U-shaped model set mean IDR values based profiles, presented in Figure 5.6. with different site classes. Symmetrical building results are also included in the figure as a reference.

Considering the X-direction based profiles, mean IDR values tend to increase with increasing irregularity levels. However, this is not observed in Y-direction where all U-shaped building responses have a similar pattern. Since the irregularity ratio is varying along Y-direction, structure seismic response is expected to be affected mainly in X-direction. In addition to these observations, IDR demands in both directions tend to increase from Site Class A to Site Class D as expected. The variation in the results has been numerically studied in detail and results are presented building-wise and story-wise in Table 5.19 to Table 5.24

In these comparison tables, mean IDR results and ratios calculated by normalizing the results with T1-based values are tabulated where mean IDR values were computed considering the results of 22 ground motion records which are presented in Table A.31 to Table A.54 in Appendix A.

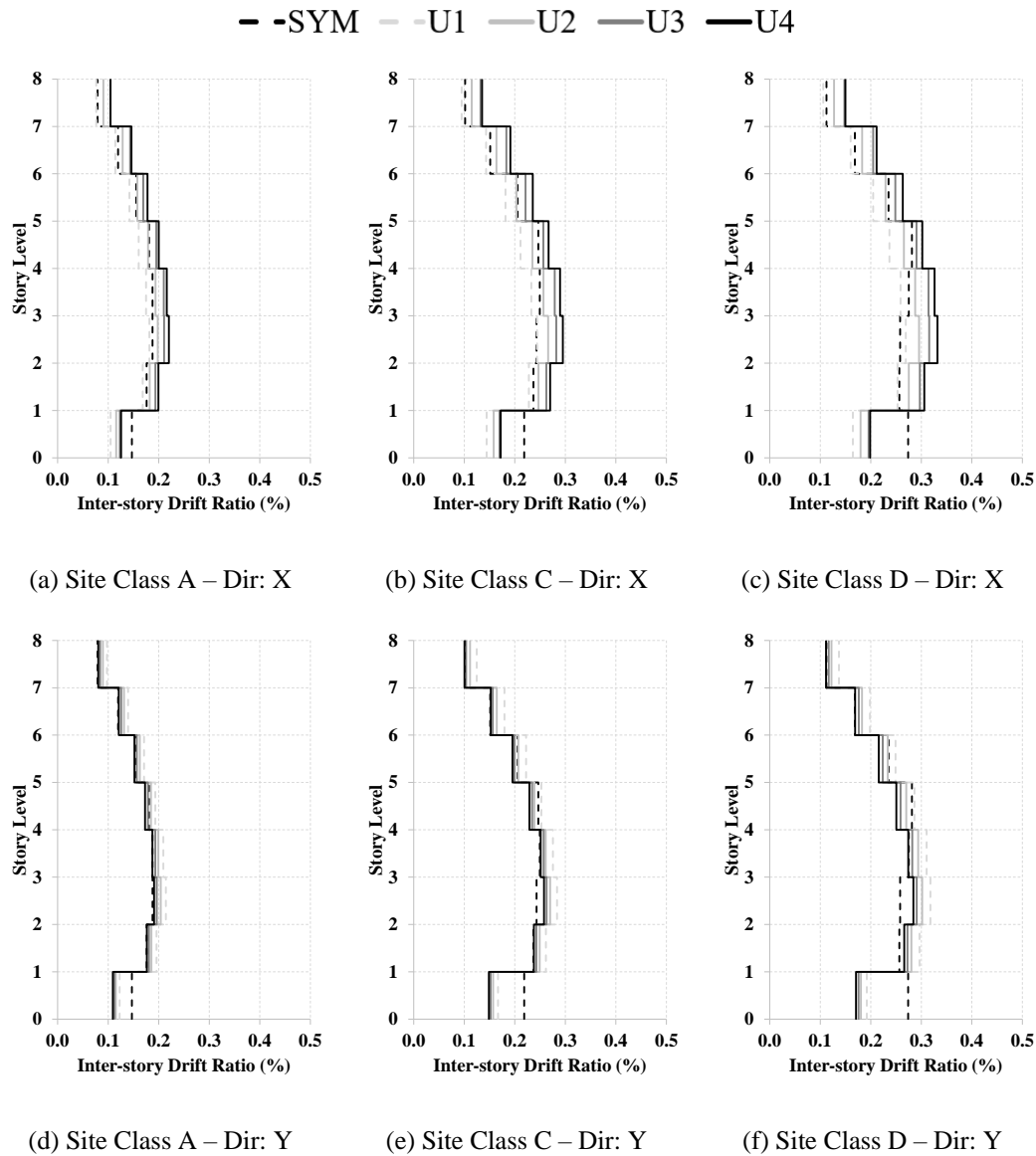


Figure 5.6. Comparison of IDR profiles for U-shaped models

Table 5.19 presents the comparison of IDR values for Site Class A in X-direction for U-shaped model set including symmetrical model. Mean IDR values reach the maximum value around Story 3 at around mid-height of the building. Mean values of the buildings increase clearly in Story 3 as goes from type U1 to U4 building. Normalized values for each building represent the increasing behavior numerically. Except for Story 8, IDR mean values increase as 8-13% for building U2, 15-25% for building U3 and 18-28% for building U4 with respect to building U1. MIDR values also verify the increase as 9.4% for building U2, 17% for building U3 and 21.8% for building U4 according to results of building U1. This determination does not represent the story variation of the compared buildings. The mean IDR value of the stories can vary 10-50% different than the MIDR result. This conceals the peak values of IDR increasing for individual stories. In addition, MIDR calculations are not sufficient to show the real relations between the buildings. At roof level, increase according to U1 results, reaches the maximum value. As the geometrical irregularity increase from 0.1 to 0.7, U1 to U4, IDR mean values increase 37% for U4 at roof story with respect to U1 results. Implicitly, determined story drift values involve the torsional contribution. Also, these results show the same increasing pattern with the T-shape building responses. Even though the story mean IDR values are close to T-shaped building presented in Table 5.1, normalized results are low according to T-shaped normalized results. This pattern is valid for the other site classes only the variation is become more apparent from Site Class A to Site Class D. IDR comparison tables of Site Class C and Site class D are presented in Table 5.21 and Table 5.23, respectively.

IDR responses for Site Class C in X-direction increase as 8-14% for building U2, 15-28% for building U3 and 19-33% for building U4 according to building U1 except for the roof story. MIDR values also verify the increase as 9.1% for building U2, 16.5% for building U3 and 21.6% for building U4 according to building U1. The mean IDR value of the stories can vary 10-50% different than the MIDR result.

IDR responses for Site Class D in X-direction increase as 8-14% for building U2, 17-27% for building U3 and 20-32% for building U4 according to building U1

except for the roof story. MIDR values also verify the increase as 9.7% for building U2, 18.2% for building U3 and 23% for building U4 according to building U1 values. The mean IDR value of the stories can vary 10-50% different than the MIDR result.

IDR values for Site Class A in Y-direction have been compared and presented in Table 5.20 for U-shaped model set including the symmetrical model. U-shaped structures are symmetrical with respect to Y-axis and the structure has not a flexible end in that direction. It is expected that response in Y-direction does not affect the irregularity belonging to the other orthogonal direction. Due to general moment-resisting framing system response, mean IDR values reach the maximum value around Story 3 at mid-height of the building. But mean values decreased slightly at Story 3 as goes from U1 to U4 building. Maximum normalized values for each building show the decreasing pattern. In addition, due to building response for each story does not represent a large variation, MIDR calculations give a general opinion for the relation of building responses. The IDR responses pattern of U-type building set in Y-direction is different from X-direction response. Increasing mass and X-direction irregularity does not result in increasing IDR responses in Y-direction. Because the irregularity ratio is varying along Y-direction; structure seismic response is expected to be affected mainly in X-direction. And also increasing the inertia of the structure in Y-direction from U1 to U4 type has an important role in the decrease pattern of the mean IDR values. In addition, normalized results are lower compared to the T-shaped results. This observation stems from the difference between the stiffness of the T-shaped and U-shaped buildings. These observations are valid for different site classes. Also, the site class effect can be observed in increasing IDR mean values Site Class A to Site Class D as expected. In Y-direction IDR comparison tables of Site Class C and Site Class D are presented in Table 5.22 and Table 5.24, respectively.

Table 5.19 Comparison of IDR (in %) results for U-shaped models (SC A – Dir: X)

SC A	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.147	0.105	0.116	1.104	0.123	1.175	0.126	1.198
2	0.176	0.168	0.182	1.083	0.193	1.149	0.199	1.185
3	0.188	0.182	0.198	1.090	0.211	1.160	0.220	1.212
4	0.188	0.175	0.194	1.107	0.210	1.202	0.216	1.235
5	0.181	0.160	0.179	1.115	0.195	1.217	0.200	1.247
6	0.156	0.142	0.158	1.109	0.169	1.192	0.178	1.250
7	0.119	0.114	0.129	1.128	0.143	1.256	0.146	1.280
8	0.079	0.076	0.091	1.186	0.105	1.370	0.105	1.369
Min	-	-	-	1.083	-	1.149	-	1.185
Max	-	-	-	1.186	-	1.370	-	1.369
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.194	0.184	0.201	1.094	0.215	1.171	0.224	1.218

Table 5.20 Comparison of IDR (in %) results for U-shaped models (SC A – Dir: Y)

SC A	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.147	0.123	0.115	0.938	0.112	0.915	0.109	0.891
2	0.176	0.196	0.186	0.949	0.181	0.924	0.176	0.902
3	0.188	0.214	0.204	0.952	0.196	0.915	0.191	0.891
4	0.188	0.209	0.199	0.953	0.193	0.924	0.187	0.897
5	0.181	0.193	0.185	0.955	0.179	0.925	0.173	0.896
6	0.156	0.171	0.163	0.951	0.157	0.917	0.152	0.889
7	0.119	0.139	0.131	0.942	0.126	0.902	0.121	0.867
8	0.079	0.098	0.090	0.918	0.084	0.863	0.080	0.824
Min	-	-	-	0.918	-	0.863	-	0.824
Max	-	-	-	0.955	-	0.925	-	0.902
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.194	0.217	0.207	0.952	0.200	0.921	0.194	0.895

Table 5.21 Comparison of IDR (in %) results for U-shaped models (SC C – Dir: X)

SC C	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.219	0.144	0.158	1.096	0.170	1.177	0.172	1.194
2	0.237	0.228	0.247	1.084	0.263	1.153	0.270	1.185
3	0.243	0.244	0.266	1.090	0.282	1.156	0.295	1.210
4	0.249	0.233	0.257	1.103	0.279	1.198	0.290	1.244
5	0.247	0.211	0.235	1.111	0.257	1.214	0.267	1.263
6	0.206	0.182	0.203	1.121	0.221	1.219	0.236	1.298
7	0.151	0.143	0.164	1.144	0.183	1.280	0.191	1.335
8	0.102	0.095	0.115	1.207	0.132	1.391	0.135	1.425
Min	-	-	-	1.084	-	1.153	-	1.185
Max	-	-	-	1.207	-	1.391	-	1.425
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.261	0.245	0.267	1.091	0.285	1.165	0.298	1.216

Table 5.22 Comparison of IDR (in %) results for U-shaped models (SC C – Dir: Y)

SC C	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.219	0.167	0.157	0.942	0.152	0.913	0.149	0.892
2	0.237	0.262	0.249	0.952	0.243	0.927	0.238	0.909
3	0.243	0.284	0.270	0.952	0.263	0.927	0.258	0.909
4	0.249	0.275	0.261	0.948	0.257	0.933	0.251	0.912
5	0.247	0.253	0.239	0.945	0.234	0.928	0.229	0.907
6	0.206	0.222	0.207	0.930	0.199	0.897	0.195	0.879
7	0.151	0.180	0.164	0.915	0.156	0.871	0.152	0.848
8	0.102	0.125	0.111	0.893	0.104	0.831	0.100	0.806
Min	-	-	-	0.893	-	0.831	-	0.806
Max	-	-	-	0.952	-	0.933	-	0.912
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.261	0.285	0.271	0.950	0.265	0.929	0.259	0.910

Table 5.23 Comparison of IDR (in %) results for U-shaped models (SC D – Dir: X)

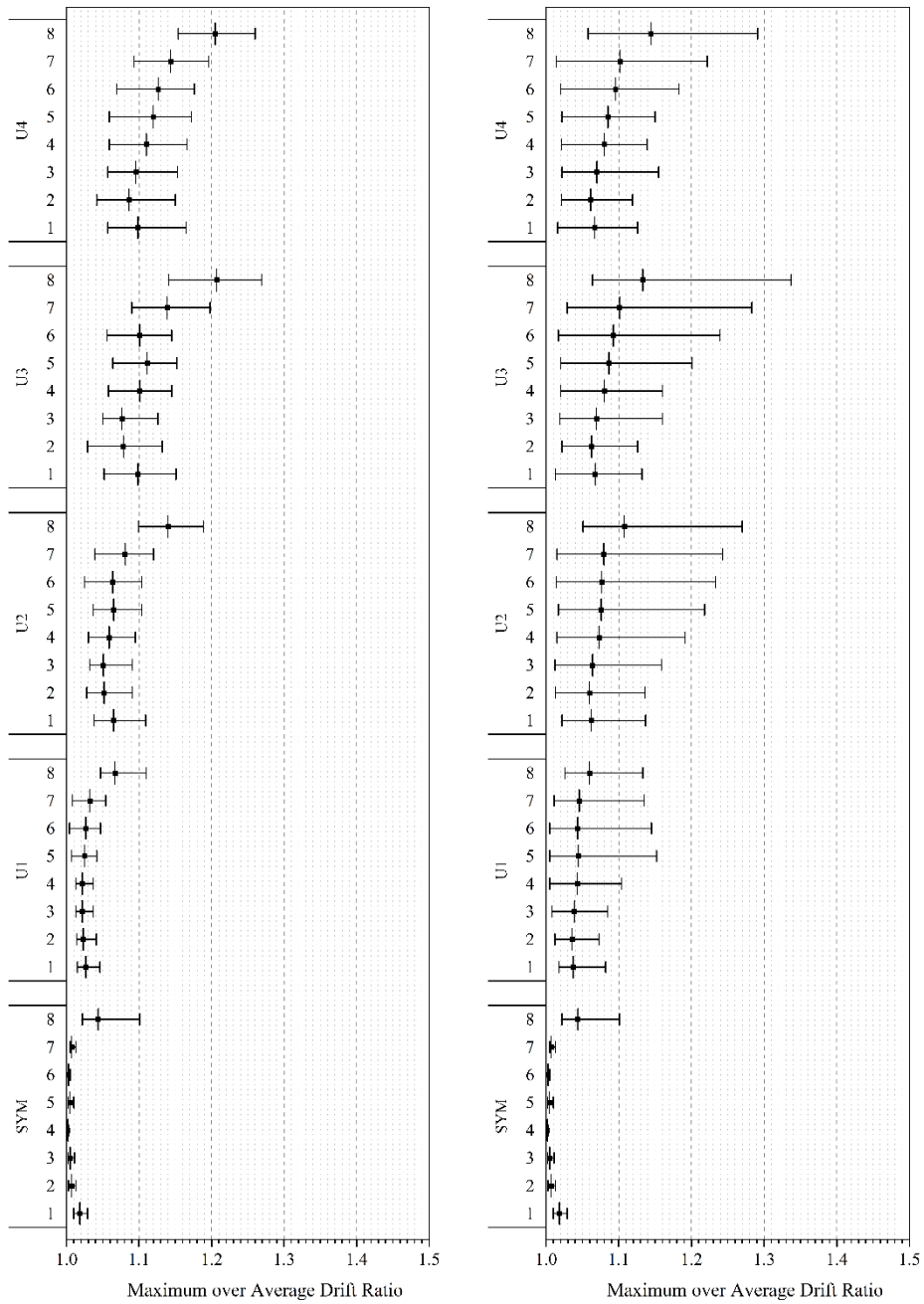
SC D	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.274	0.165	0.180	1.093	0.196	1.189	0.199	1.208
2	0.257	0.253	0.275	1.088	0.297	1.174	0.306	1.209
3	0.258	0.269	0.296	1.097	0.316	1.172	0.332	1.232
4	0.275	0.259	0.288	1.111	0.314	1.213	0.326	1.259
5	0.281	0.237	0.265	1.120	0.290	1.225	0.302	1.274
6	0.235	0.205	0.229	1.120	0.248	1.214	0.263	1.286
7	0.169	0.160	0.183	1.142	0.205	1.277	0.211	1.320
8	0.112	0.106	0.127	1.201	0.148	1.395	0.150	1.414
Min	-	-	-	1.088	-	1.172	-	1.208
Max	-	-	-	1.201	-	1.395	-	1.414
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.312	0.275	0.302	1.097	0.325	1.182	0.338	1.230

Table 5.24 Comparison of IDR (in %) results for U-shaped models (SC D – Dir: Y)

SC D	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	0.274	0.192	0.180	0.940	0.176	0.915	0.171	0.889
2	0.257	0.297	0.280	0.946	0.273	0.919	0.266	0.898
3	0.258	0.318	0.302	0.949	0.291	0.915	0.284	0.893
4	0.275	0.311	0.294	0.946	0.282	0.908	0.274	0.883
5	0.281	0.287	0.270	0.943	0.259	0.903	0.251	0.874
6	0.235	0.249	0.234	0.938	0.224	0.898	0.216	0.866
7	0.169	0.198	0.183	0.921	0.176	0.888	0.169	0.852
8	0.112	0.137	0.122	0.893	0.117	0.851	0.111	0.812
Min	-	-	-	0.893	-	0.851	-	0.812
Max	-	-	-	0.949	-	0.919	-	0.898
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MIDR	0.312	0.324	0.307	0.948	0.296	0.913	0.289	0.893

5.2.2 Maximum/Average story displacement (β)

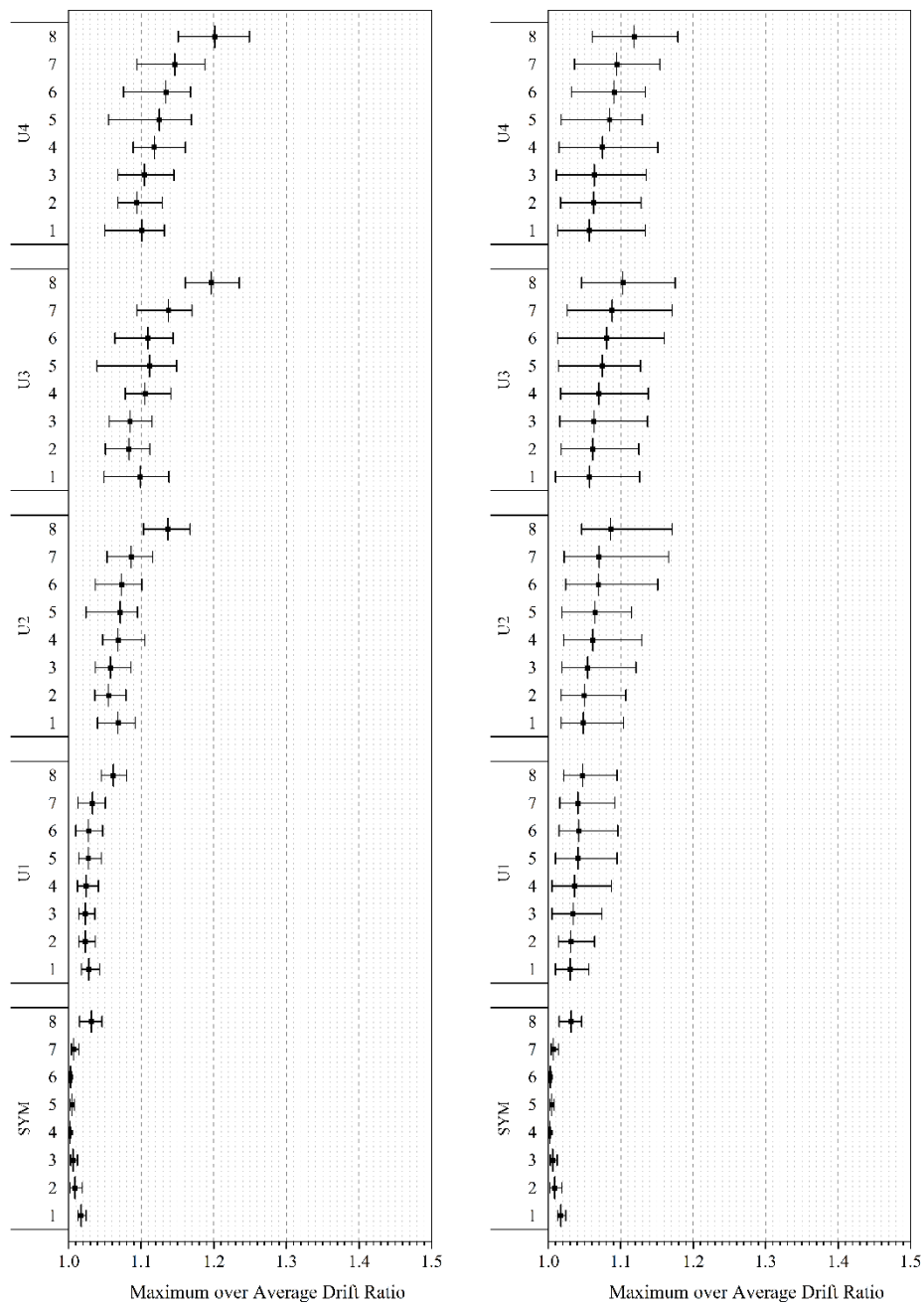
Figure 5.7, Figure 5.8 and Figure 5.9 display the maximum displacement over average displacement ratio of each story of U-shaped model set for Site Class A, Site Class C and Site Class D respectively. Symmetrical building has also included as a reference. Maximum and average values are determined for 22 ground motion records. It is observed that that the building has higher geometrical irregularity ratio has also the higher β ratio. For symmetrical building β value is the minimum but for the building with the maximum irregularity which is U4, β reaches to 1.2. β ratios at each story for all building increase approaching to the upper stories and reach the maximum value at the roof story. In addition, the band width distance between the upper and lower bound increase as increasing story level and also increase with the higher irregularity ratio. Band with reaches the maximum value at the roof level for all building. U4 has the maximum band width comparing to other buildings. Also it can be observed that, when the irregularity ratio increase U1 to U4, β ratio reach approximately 1.2 at the roof story in X-direction. At first story β ratio increases approximately 1.05. This value also depends on the mass and stiffness of the wings of building. β ratio provide an observation about the flexibility of the related story and the whole building. Similarly, in Y-direction β values display the similar increasing pattern as X-direction results with wider band width. But mean values of β for each story for each building in Y-direction is generally close the results for X-direction except some local variations. In addition, band width in Y-direction is much wider for each case. All observations are mainly valid for each site classes. In addition, U-shaped model set results provide a strong justification for the correlation of irregularity ratio and β ratio considering T-shaped model results.



(a) X-direction

(b) Y-direction

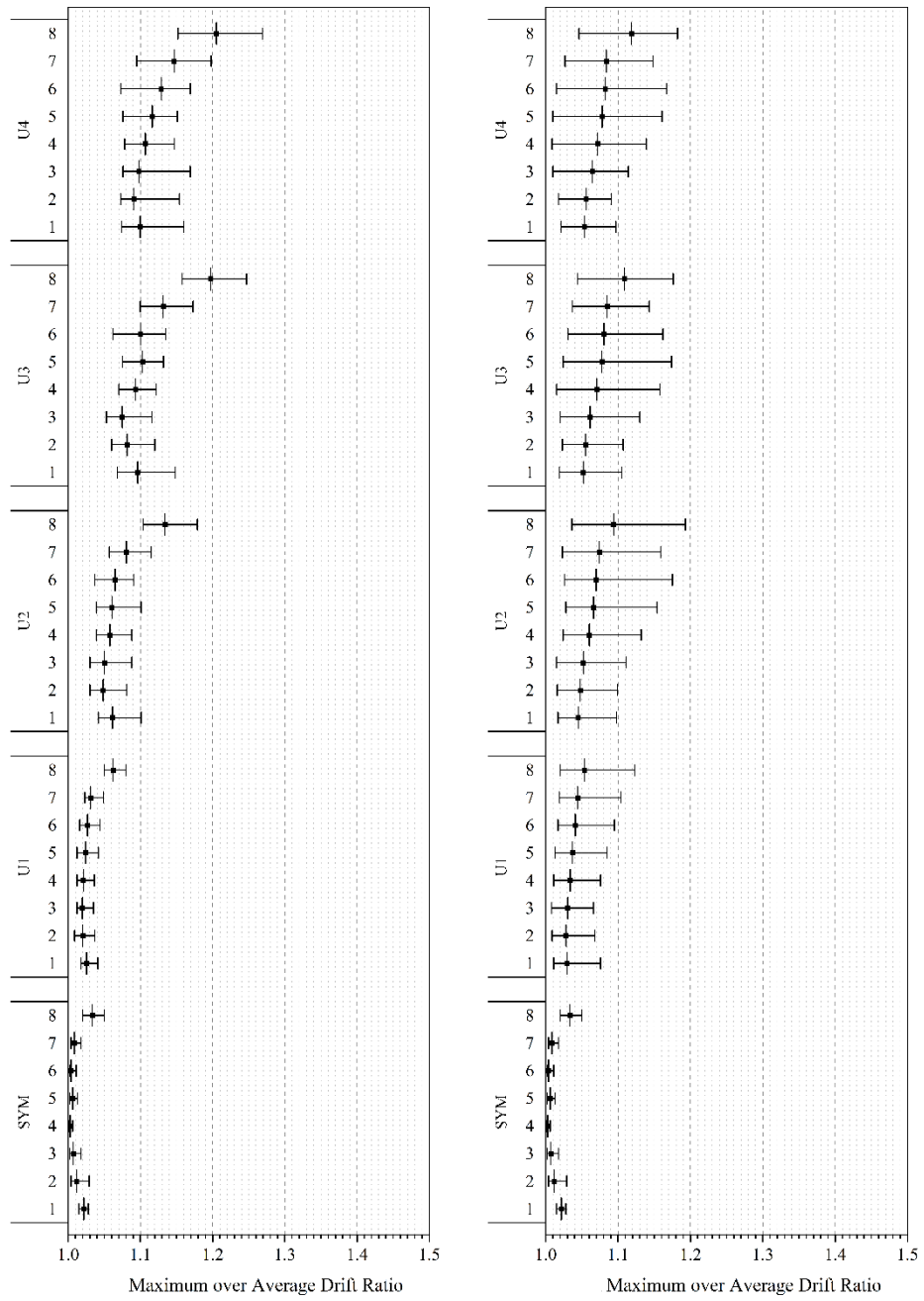
Figure 5.7. Variation of maximum drift to average drift ratios for U-shaped models (Site Class A)



(a) X-direction

(b) Y-direction

Figure 5.8. Variation of maximum drift to average drift ratios for U-shaped models (Site Class C)



(a) X-direction

(b) Y-direction

Figure 5.9. Variation of maximum drift to average drift ratios for U-shaped models (Site Class D)

5.2.3 Joint drift ratio (JDR)

The joint drift ratio values for U-shaped building set are provided in Table 5.25. Plan locations of monitored joints are displayed in Figure 4.10. JDR values are given in both directions, U1 and U2, X and Y direction respectively. Normalized JDR ratios are shown in Table 5.26 and values of T2, T3 and T4 buildings are normalized with T1 JDR values.

At the flexible end joint, in X-direction (U1), as geometric plan irregularity ratio increase (from T1 to T4) JDR increase approximately 45%. For Site Class A, for T4, 43%, for Site Class C 44% and Site Class D 47% increase are observed. But at the center joint, as the geometric plan irregularity ratio increase (from T1 to T4) JDR increase approximately 5%. On the other hand, in Y-direction (U2), as geometric plan irregularity ratio increase (from T1 to T4) JDR decrease approximately 15% for both two joints. In addition, as site class characteristics get worse, JDR values tend to increase for each building in both directions.

Table 5.25 Comparison of JDR results for U-shaped models

	CENTER U1			CENTER U2			FLEXIBLE END U1			FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
U1	0.133	0.175	0.197	0.160	0.217	0.229	0.145	0.183	0.190	0.176	0.211	0.179
U2	0.141	0.184	0.208	0.147	0.193	0.218	0.150	0.198	0.224	0.148	0.195	0.220
U3	0.144	0.188	0.213	0.142	0.190	0.202	0.173	0.217	0.222	0.157	0.189	0.158
U4	0.145	0.190	0.215	0.137	0.184	0.197	0.181	0.229	0.234	0.152	0.183	0.154

Table 5.26 Comparison of normalized JDR results for U-shaped models

	NORMALIZED CENTER U1			NORMALIZED CENTER U2			NORMALIZED FLEXIBLE END U1			NORMALIZED FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
U1	-	-	-	-	-	-	-	-	-	-	-	-
U2	1.058	1.049	1.055	0.920	0.888	0.953	1.031	1.079	1.180	0.842	0.923	1.229
U3	1.082	1.070	1.080	0.885	0.876	0.883	1.188	1.183	1.172	0.890	0.894	0.883
U4	1.091	1.082	1.091	0.859	0.850	0.860	1.242	1.251	1.231	0.862	0.867	0.857

5.2.4 Base shear ratio (BSR)

The base shear ratio of U-shaped model set has been provided in Table 5.9. In U-shaped model set, it can be observed that the base shear ratio does not show significant changes with the variation of irregularity ratio changes. Site class variation does not affect the results of U-shaped model set BSR results. Surely, different ground motions create different base shear ratios but for each site class similar BRS responses within the U-shaped model set are monitored. But, from the close observation of fundamental mode shapes, excessive localized deformation in members placed near the flexible side of plan geometry of the structures are observed. This may increase the vulnerability of such structures. Fixed based and base isolated building BSR values for U-shaped buildings and site classes have already been given in Table 5.10. It is clear that the building with a seismic isolator have the smaller base shear ratio according to fixed base system. The ratio of the BSR values of the isolated building to fixed base building are approximately 0.22, 0.14 and 0.16 for Site Class A, Site Class B and Site Class D respectively. However, it is not observed any variation pattern based on the building irregularity ratio. Because isolator systems for all buildings have been designed as same target period and same target displacement even though all have different superstructure masses and stiffness.

Table 5.27 Comparison of BSR results for U-shaped models

SITE CLASS	BLDG DIR	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
A	X	0.077	0.080	0.080	0.999	0.080	0.998	0.080	0.997
	Y	0.077	0.080	0.080	1.001	0.080	1.002	0.080	1.002
C	X	0.096	0.101	0.101	1.000	0.101	1.000	0.101	0.999
	Y	0.096	0.101	0.101	1.001	0.101	1.002	0.101	1.001
D	X	0.115	0.124	0.124	0.999	0.124	1.000	0.124	1.001
	Y	0.115	0.125	0.124	0.996	0.124	0.996	0.124	0.996

5.2.5 Peak floor acceleration (PFA)

PFA-based profiles for U-shaped model set with different site classes is presented in Figure 5.10. Symmetrical building results are also included in the figure as a reference. Considering the X-direction based profiles, mean PFA values tend to slightly increase with increasing irregularity level. Especially at the roof level, PFA variation becomes more clear between the buildings in the model set. However, this observation is not valid for Y-direction where all U-shaped building responses have a similar pattern and does not show significant variation between the buildings. Since the irregularity ratio is varying along Y-direction, structure seismic response is expected to be affected mainly in X-direction. In addition to these observations, PFA demands in both directions tend to increase from Site Class A to Site Class D as expected.

Peak floor acceleration responses of U-shaped model set depend on the three different site classes presented in Table 5.28 and Table 5.33. It is observed that the story acceleration increases as the U1 goes to U4. Increasing in story acceleration mainly depends on the increase in mass of the buildings but additionally, irregularity ratio contributes to the PFA results especially roof responses therefore variation between the buildings can be observed. As expected, PFA results in both directions tend to increase from Site Class A to Site Class D, therefore all buildings have higher story acceleration at site class D and minimum story acceleration at Site Class A. In these comparison tables, mean PFA results and ratios calculated by normalizing the results with U1-based values are tabulated where mean PFA values were computed considering the results of 22 ground motion records which are presented in Table A.130 to Table A.152 in Appendix B.

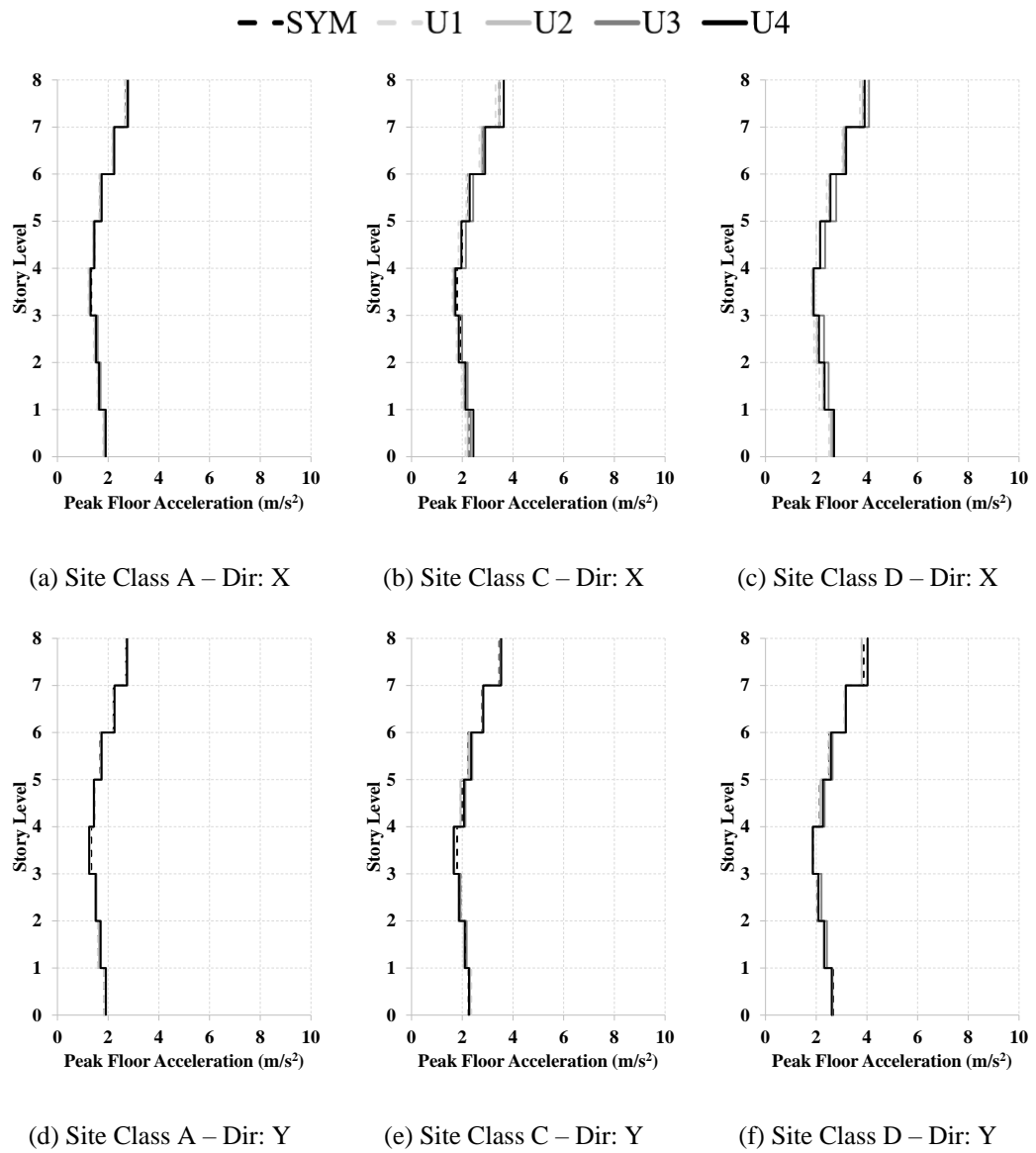


Figure 5.10. Comparison of PFA profiles for U-shaped models

Table 5.28 presents the comparison of PFA values for Site Class A in X-direction for U-shaped model set including symmetrical model. Mean PFA values decrease to the minimum value around Story 4 as in the mid-height of the building. However, mean PFA values of the buildings slightly increase in Story 4 as goes to U1 to U4. All normalized values represent the slightly increasing pattern numerically. PFA mean values are increased 2.5% for building U2, 5% for U3 and 5% for U4 according to building U1. The normalized value of the stories can vary as 1.00-1.03 for U1, 1.03-1.1 for U3 and 1.038-1.071.

PFA values for Site Class A in Y-direction have been compared in Table 5.29 for U-shaped model set including the symmetrical model. Mean PFA values reach the maximum value around Story 4 in the mid-height of the building as similar to X-direction response. But mean values decreased slightly or close to each other in Story 4 as goes to U1 to U4. However maximum normalized values for each building represent a generally slight increase or close to U1 results. In addition, the story does not represent a large variation, MIDR calculations give a general sight for the relation of building responses. Response in Y direction is not significantly different from X direction responses. Increasing mass and irregularity does not result in increasing PFA responses in Y direction.

The increasing pattern of X-direction PFA becomes more clear Site Class A to Site Class C which is presented in Table 5.30 and Table 5.33. But in Y-direction even though the PFA mean values increase with the site classes, the normalized ratio of each building does not significantly change. Compared to T-shaped building responses a similar pattern is observed for PFA demand in both directions.

Table 5.28 Comparison of PFA results for U-shaped models (SC A – Dir: X)

SC A	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	1.834	1.802	1.842	1.023	1.877	1.042	1.905	1.057
2	1.609	1.580	1.615	1.022	1.701	1.076	1.640	1.038
3	1.515	1.434	1.479	1.032	1.588	1.108	1.521	1.061
4	1.334	1.227	1.265	1.031	1.290	1.051	1.314	1.071
5	1.453	1.398	1.411	1.009	1.464	1.047	1.454	1.040
6	1.693	1.648	1.691	1.026	1.756	1.065	1.741	1.057
7	2.215	2.158	2.197	1.018	2.224	1.030	2.241	1.038
8	2.706	2.653	2.723	1.026	2.798	1.054	2.774	1.045
Min	-	-	-	1.009	-	1.030	-	1.038
Max	-	-	-	1.032	-	1.108	-	1.071
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	2.706	2.653	2.723	1.026	2.798	1.054	2.774	1.045

Table 5.29 Comparison of PFA results for U-shaped models (SC A – Dir: Y)

SC A	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	1.834	1.830	1.899	1.037	1.919	1.048	1.909	1.043
2	1.609	1.592	1.636	1.027	1.719	1.080	1.696	1.065
3	1.515	1.489	1.484	0.996	1.534	1.030	1.508	1.012
4	1.334	1.288	1.265	0.982	1.253	0.972	1.252	0.972
5	1.453	1.434	1.420	0.991	1.448	1.010	1.440	1.004
6	1.693	1.708	1.724	1.010	1.753	1.027	1.737	1.017
7	2.215	2.193	2.262	1.031	2.261	1.031	2.250	1.026
8	2.706	2.690	2.775	1.031	2.750	1.022	2.742	1.019
Min	-	-	-	0.982	-	0.972	-	0.972
Max	-	-	-	1.037	-	1.080	-	1.065
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	2.706	2.690	2.775	1.031	2.750	1.022	2.742	1.019

Table 5.30 Comparison of PFA results for U-shaped models (SC C – Dir: X)

SC C	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	2.251	2.130	2.219	1.042	2.335	1.096	2.438	1.144
2	2.113	1.971	2.066	1.048	2.212	1.122	2.131	1.081
3	1.928	1.778	1.855	1.043	1.992	1.120	1.865	1.049
4	1.799	1.613	1.664	1.031	1.697	1.052	1.731	1.073
5	1.990	1.853	1.944	1.049	2.141	1.155	1.966	1.061
6	2.244	2.162	2.253	1.042	2.433	1.125	2.296	1.062
7	2.789	2.674	2.765	1.034	2.830	1.059	2.901	1.085
8	3.462	3.312	3.459	1.044	3.640	1.099	3.635	1.098
Min	-	-	-	1.031	-	1.052	-	1.049
Max	-	-	-	1.049	-	1.155	-	1.144
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	3.462	3.312	3.459	1.044	3.640	1.099	3.635	1.098

Table 5.31 Comparison of PFA results for U-shaped models (SC C – Dir: Y)

SC C	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	2.251	2.355	2.305	0.978	2.283	0.969	2.264	0.961
2	2.113	2.052	2.064	1.006	2.172	1.059	2.104	1.025
3	1.928	1.833	1.841	1.005	1.929	1.052	1.874	1.022
4	1.799	1.696	1.677	0.989	1.659	0.978	1.667	0.983
5	1.990	1.919	1.935	1.009	2.125	1.108	2.067	1.077
6	2.244	2.215	2.271	1.025	2.396	1.082	2.350	1.061
7	2.789	2.809	2.834	1.009	2.818	1.003	2.828	1.007
8	3.462	3.528	3.495	0.991	3.526	1.000	3.538	1.003
Min	-	-	-	0.978	-	0.969	-	0.961
Max	-	-	-	1.025	-	1.108	-	1.077
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	3.462	3.528	3.495	0.991	3.526	1.000	3.538	1.003

Table 5.32 Comparison of PFA results for U-shaped models (SC D – Dir: X)

SC D	SYM	U1	U2		U3		U4	
X	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	2.669	2.503	2.580	1.031	2.649	1.058	2.707	1.081
2	2.313	2.127	2.265	1.065	2.489	1.170	2.330	1.096
3	2.036	1.914	2.033	1.062	2.311	1.207	2.111	1.103
4	1.872	1.820	1.867	1.026	1.878	1.032	1.902	1.045
5	2.135	2.004	2.122	1.059	2.355	1.175	2.158	1.077
6	2.511	2.415	2.514	1.041	2.791	1.155	2.562	1.061
7	3.133	3.031	3.080	1.016	3.149	1.039	3.183	1.050
8	3.875	3.723	3.831	1.029	4.081	1.096	3.914	1.051
Min	-	-	-	1.016	-	1.032	-	1.045
Max	-	-	-	1.065	-	1.207	-	1.103
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	3.875	3.723	3.831	1.029	4.081	1.096	3.914	1.051

Table 5.33 Comparison of PFA results for U-shaped models (SC D – Dir: X)

SC D	SYM	U1	U2		U3		U4	
Y	Mean	Mean	Mean	U2/U1	Mean	U3/U1	Mean	U4/U1
1	2.669	2.624	2.625	1.000	2.639	1.006	2.612	0.995
2	2.313	2.288	2.272	0.993	2.422	1.058	2.321	1.014
3	2.036	2.096	2.055	0.980	2.207	1.053	2.090	0.997
4	1.872	1.857	1.863	1.003	1.864	1.004	1.865	1.005
5	2.135	2.139	2.169	1.014	2.331	1.090	2.263	1.058
6	2.511	2.465	2.530	1.026	2.646	1.073	2.582	1.047
7	3.133	3.102	3.135	1.010	3.173	1.023	3.170	1.022
8	3.875	3.784	3.793	1.002	4.021	1.062	4.025	1.064
Min	-	-	-	0.980	-	1.004	-	0.995
Max	-	-	-	1.026	-	1.090	-	1.064
	SYM	U1	U2	U2/U1	U3	U3/U1	U4	U4/U1
MFA	3.875	3.784	3.793	1.002	4.021	1.062	4.025	1.064

5.3 Evaluation of Mass Concentrated Model Set Results

Three different models are generated from T4, U4 and SYM models applying non-uniform mass distribution. Results have been evaluated for three cases. Each mass concentrated building has been compared to the original model. Three main comparative model sets are presented for evaluation, T4Mass and T4, U4Mass and U4, SYMass and SYM models results have been compared each other.

5.3.1 Interstory drift ratio (IDR)

IDR-based profile comparisons for three main comparative model set with different site classes are presented in Figure 5.11, Figure 5.12 and Figure 5.13. Symmetrical and Symmetrical Mass building comparative IDR profiles are displayed in Figure 5.11 for three different site classes. Symmetrical Mass model responses are slightly higher than the base model for both X and Y-direction. Mass concentrated location is given in Figure 3.8. Variance becomes more visible from Site Class A to Site Class D around at mid-height of the building.

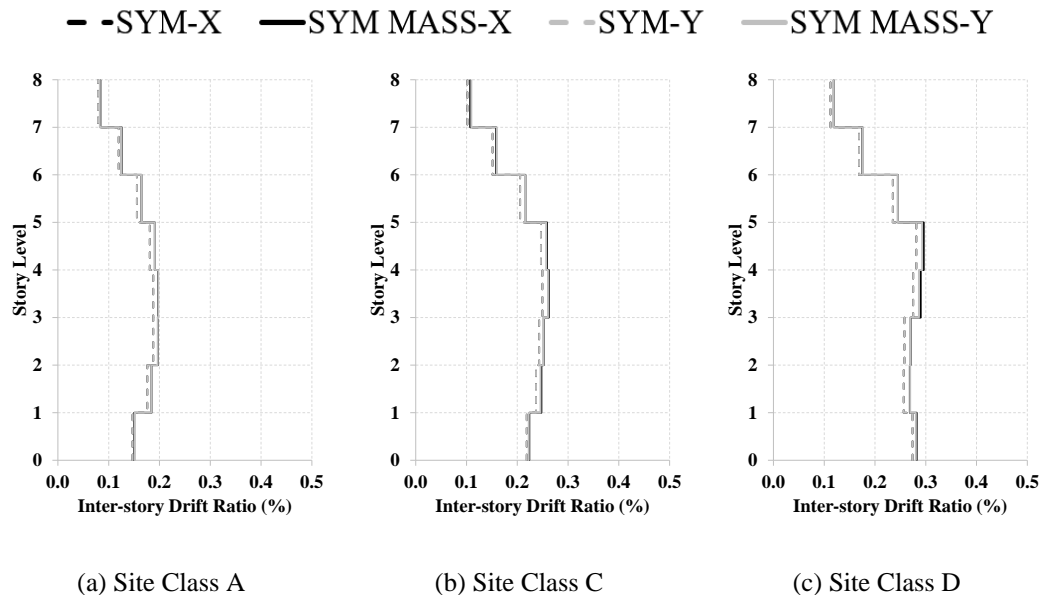


Figure 5.11. Comparison of IDR profiles for Symmetric and Symmetric-Mass models

Mean IDR values of mass concentrated model set were computed considering the results of 22 ground motion records which are presented in between Table A.55 to Table A.72 in Appendix A.

T4 and T4 Mass comparison IDR profiles are presented in Figure 5.12. for three different site classes. T4 Mass model IDR responses are lower than the base model for both X and Y-direction. Variance becomes more visible goes from Site Class A to Site Class D. This observation results from the location of mass concentrated part on the plan as displayed in Figure 3.8. For T4 Mass building mass concentrated region is placed on the stiff side of the building. This reduced the IDR demands of the building according to the base model T4 with uniform mass distribution.

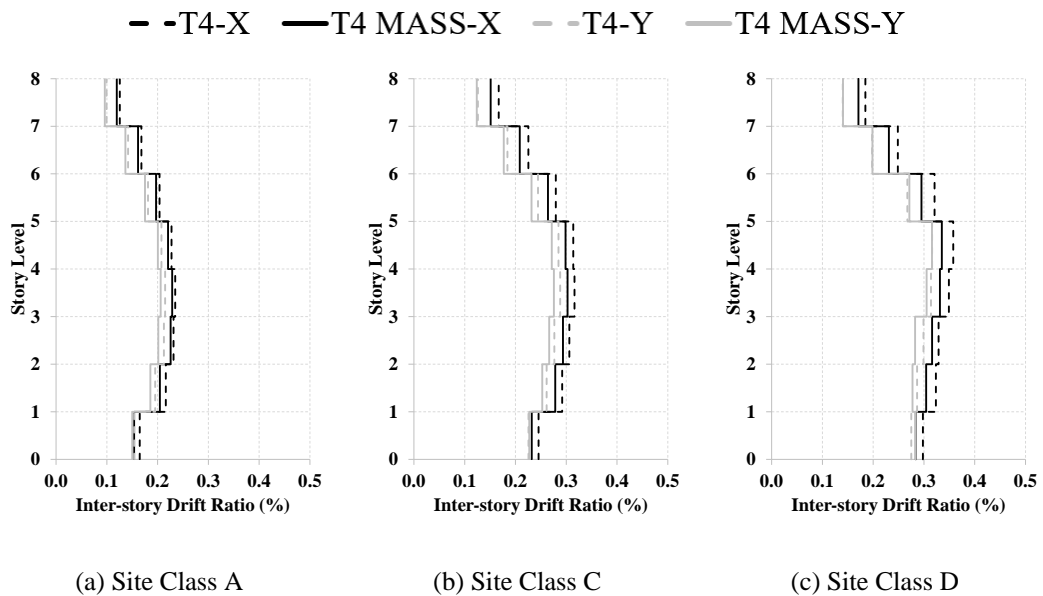


Figure 5.12. Comparison of IDR profiles for T4 and T4-Mass models

U4 and U4 Mass comparison IDR profiles are presented in Figure 5.13 for three different site classes. IDR responses of the U4 Mass model are higher than the base model U4 for both X and Y-direction. Variance becomes more visible from Site Class A to Site Class D. This observation results from the location of mass concentration region on the plan as displayed in Figure 3.8. Mass concentrated region for U4 Mass building is placed on the flexible side of the building. This increases the IDR demands of the building according to the base model with uniform mass distribution.

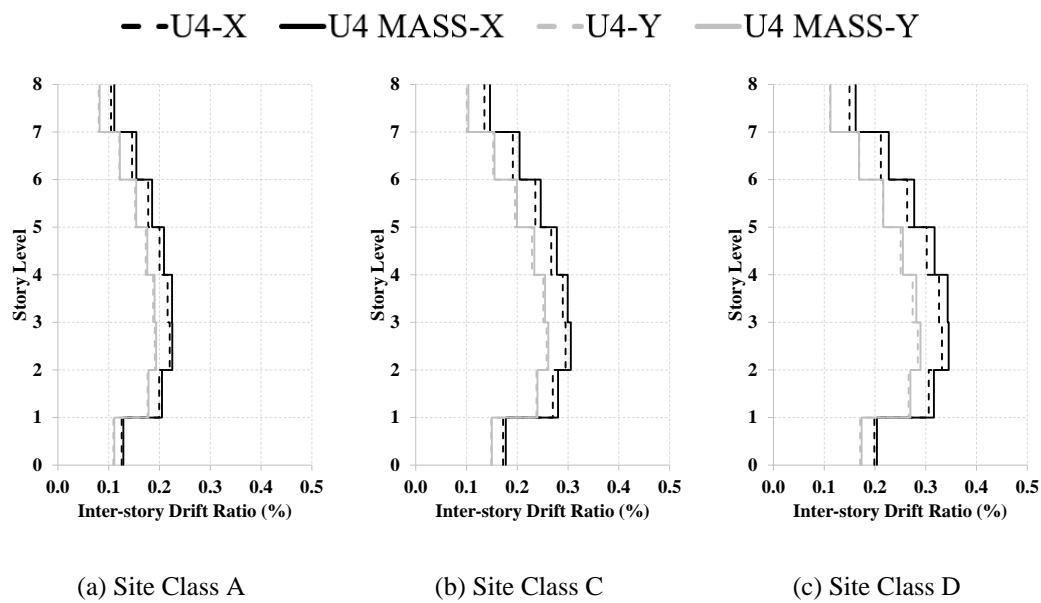


Figure 5.13. Comparison of IDR profiles for U4 and U4-Mass models

Table 5.34 Comparison of IDR (in %) results for Symmetric and Symmetric-Mass models for Site Class A

SC A	<u>SYM-X</u>	<u>SYMM-X</u>	<u>SYMM-X</u>	<u>SYM-Y</u>	<u>SYMM-Y</u>	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	0.147	0.150	1.022	0.147	0.151	1.028
2	0.176	0.184	1.046	0.176	0.184	1.045
3	0.188	0.197	1.050	0.188	0.197	1.047
4	0.188	0.197	1.049	0.188	0.198	1.052
5	0.181	0.191	1.054	0.181	0.191	1.055
6	0.156	0.165	1.058	0.156	0.165	1.059
7	0.119	0.126	1.051	0.119	0.125	1.045
8	0.079	0.084	1.058	0.079	0.083	1.044
Min	-	-	1.022	-	-	1.028
Max	-	-	1.058	-	-	1.059
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MIDR	0.194	0.203	1.046	0.194	0.203	1.047

Table 5.35 Comparison of IDR (in %) results for Symmetric and Symmetric-Mass models for Site Class C

SC C	<u>SYM-X</u>	<u>SYMM-X</u>	<u>SYMM-X</u>	<u>SYM-Y</u>	<u>SYMM-Y</u>	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	0.219	0.224	1.024	0.219	0.223	1.018
2	0.237	0.247	1.045	0.237	0.246	1.038
3	0.243	0.252	1.037	0.243	0.252	1.036
4	0.249	0.262	1.050	0.249	0.261	1.044
5	0.247	0.259	1.049	0.247	0.257	1.042
6	0.206	0.216	1.050	0.206	0.215	1.047
7	0.151	0.158	1.047	0.151	0.160	1.055
8	0.102	0.107	1.054	0.102	0.109	1.075
Min	-	-	1.024	-	-	1.018
Max	-	-	1.054	-	-	1.075
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MIDR	0.261	0.273	1.043	0.261	0.271	1.036

Table 5.36 Comparison of IDR (in %) results for Symmetric and Symmetric-Mass models for Site Class D

SC D	SYM-X	SYMM-X	<u>SYMM-X</u>	SYM-Y	SYMM-Y	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	0.274	0.282	1.030	0.274	0.281	1.025
2	0.257	0.269	1.047	0.257	0.269	1.050
3	0.258	0.270	1.046	0.258	0.269	1.042
4	0.275	0.290	1.054	0.275	0.286	1.041
5	0.281	0.296	1.052	0.281	0.293	1.040
6	0.235	0.245	1.043	0.235	0.245	1.042
7	0.169	0.175	1.040	0.169	0.176	1.045
8	0.112	0.119	1.056	0.112	0.119	1.057
Min	-	-	1.030	-	-	1.025
Max	-	-	1.056	-	-	1.057
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MIDR	0.312	0.326	1.043	0.312	0.323	1.036

Table 5.37 Comparison of IDR (in %) results for T4 and T4-Mass models for Site Class A

SC A	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	0.165	0.154	0.934	0.154	0.150	0.976
2	0.216	0.204	0.946	0.195	0.186	0.951
3	0.231	0.226	0.975	0.212	0.201	0.948
4	0.235	0.229	0.974	0.215	0.206	0.959
5	0.227	0.221	0.970	0.208	0.200	0.965
6	0.204	0.197	0.966	0.181	0.175	0.967
7	0.168	0.161	0.960	0.142	0.137	0.963
8	0.125	0.120	0.953	0.099	0.096	0.966
Min	-	-	0.934	-	-	0.948
Max	-	-	0.975	-	-	0.976
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MIDR	0.239	0.234	0.978	0.218	0.211	0.965

Table 5.38 Comparison of IDR (in %) results for T4 and T4-Mass models for Site Class C

SC C	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	0.246	0.232	0.945	0.226	0.227	1.006
2	0.292	0.278	0.953	0.261	0.253	0.967
3	0.306	0.294	0.959	0.277	0.266	0.963
4	0.316	0.303	0.957	0.288	0.276	0.957
5	0.314	0.299	0.952	0.285	0.272	0.954
6	0.279	0.264	0.944	0.244	0.232	0.948
7	0.226	0.208	0.924	0.184	0.177	0.960
8	0.167	0.151	0.904	0.126	0.124	0.983
Min	-	-	0.904	-	-	0.948
Max	-	-	0.959	-	-	1.006
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MIDR	0.323	0.307	0.953	0.294	0.284	0.966

Table 5.39 Comparison of IDR (in %) results for T4 and T4-Mass models for Site Class D

SC D	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	0.298	0.284	0.953	0.275	0.284	1.032
2	0.324	0.304	0.941	0.286	0.277	0.968
3	0.329	0.316	0.961	0.299	0.283	0.945
4	0.349	0.332	0.950	0.314	0.305	0.973
5	0.358	0.335	0.938	0.316	0.316	0.999
6	0.321	0.295	0.920	0.267	0.271	1.015
7	0.249	0.231	0.929	0.198	0.199	1.003
8	0.185	0.171	0.925	0.140	0.140	1.004
Min	-	-	0.920	-	-	0.945
Max	-	-	0.961	-	-	1.032
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MIDR	0.372	0.351	0.945	0.337	0.339	1.005

Table 5.40 Comparison of IDR (in %) results for U4 and U4-Mass models for Site
Class A

SC A	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	0.126	0.129	1.025	0.109	0.111	1.015
2	0.199	0.205	1.027	0.176	0.178	1.012
3	0.220	0.225	1.023	0.191	0.193	1.013
4	0.216	0.225	1.041	0.187	0.190	1.016
5	0.200	0.209	1.044	0.173	0.176	1.017
6	0.178	0.186	1.044	0.152	0.154	1.015
7	0.146	0.154	1.056	0.121	0.122	1.009
8	0.105	0.111	1.061	0.080	0.082	1.021
Min	-	-	1.023	-	-	1.009
Max	-	-	1.061	-	-	1.021
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MIDR	0.224	0.230	1.028	0.194	0.197	1.012

Table 5.41 Comparison of IDR (in %) results for U4 and U4-Mass models for Site
Class C

SC C	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	0.172	0.177	1.030	0.149	0.150	1.007
2	0.270	0.280	1.039	0.238	0.240	1.008
3	0.295	0.305	1.035	0.258	0.261	1.013
4	0.290	0.299	1.034	0.251	0.255	1.014
5	0.267	0.278	1.041	0.229	0.233	1.019
6	0.236	0.246	1.045	0.195	0.199	1.021
7	0.191	0.205	1.070	0.152	0.155	1.018
8	0.135	0.146	1.081	0.100	0.104	1.032
Min	-	-	1.030	-	-	1.007
Max	-	-	1.081	-	-	1.032
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MIDR	0.298	0.310	1.041	0.259	0.262	1.012

Table 5.42 Comparison of IDR (in %) results for U4 and U4-Mass models for Site Class D

SC D	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	0.199	0.204	1.026	0.171	0.174	1.017
2	0.306	0.316	1.033	0.266	0.270	1.013
3	0.332	0.345	1.040	0.284	0.290	1.019
4	0.326	0.343	1.053	0.274	0.281	1.026
5	0.302	0.317	1.051	0.251	0.255	1.018
6	0.263	0.277	1.053	0.216	0.216	1.003
7	0.211	0.227	1.074	0.169	0.168	0.997
8	0.150	0.162	1.081	0.111	0.112	1.009
Min	-	-	1.026	-	-	0.997
Max	-	-	1.081	-	-	1.026
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MIDR	0.338	0.356	1.053	0.289	0.295	1.022

Sym and Sym Mass comparison tables of IDR responses are presented in Table 5.34, Table 5.35 and Table 5.36 for Site Class A, Site Class C and Site Class D, respectively. Mean IDR values reach the maximum value around Story 4 but for Site Class D maximum IDR values occurs at Story 5. Normalized MIDR ratio in X-direction, increase as 4.6% for Site Class A, 4.3% for Site Class C and 4.3% for Site Class D according to base building. In Y-direction IDR results increase 4.7%, 3.6% and 3.6% for Site Class A, Site Class C and Site Class D, respectively.

IDR comparative tables of T4 and T4 Mass are presented in Table 5.37, Table 5.38 and Table 5.39 and for Site Class A, Site Class C and Site Class D, respectively. Mean IDR values reach the maximum value around Story 4 but for Site Class D maximum IDR values occurs at Story 5. Normalized MIDR ratio in X-direction, decrease as 1.2% for Site Class A, 4.7% for Site Class C and 5.5% for Site Class D according to base building. In Y-direction IDR results decrease varies approximately 0-3.5% for all site classes.

U4 and U4 Mass comparison tables of IDR responses are presented in Table 5.40, Table 5.41 and Table 5.42 for Site Class A, Site Class C and Site Class D,

respectively. Mean IDR values reach the maximum value around Story 3. Normalized MIDR ratio in X-direction, increase as 2.8% for Site Class A, 4.1% for Site Class C and 5.3% for Site Class D according to base building. In Y-direction IDR results increase varies approximately 1-2% for all site classes.

5.3.2 Maximum/Average story displacement (β)

- *Symmetric and Symmetric Mass Building Comparison*

The maximum displacement and average displacement ratio of at each story for Sym and Sym Mass buildings have presented in Figure 5.14, Figure 5.15 and Figure 5.16, for Site class A, Site class C, Site class D, respectively. It is observed that mass concentrated building has approximately 5% higher β values according to base models, especially roof story is affected significantly compared to lower stories, β value reach 1.15 at that level.

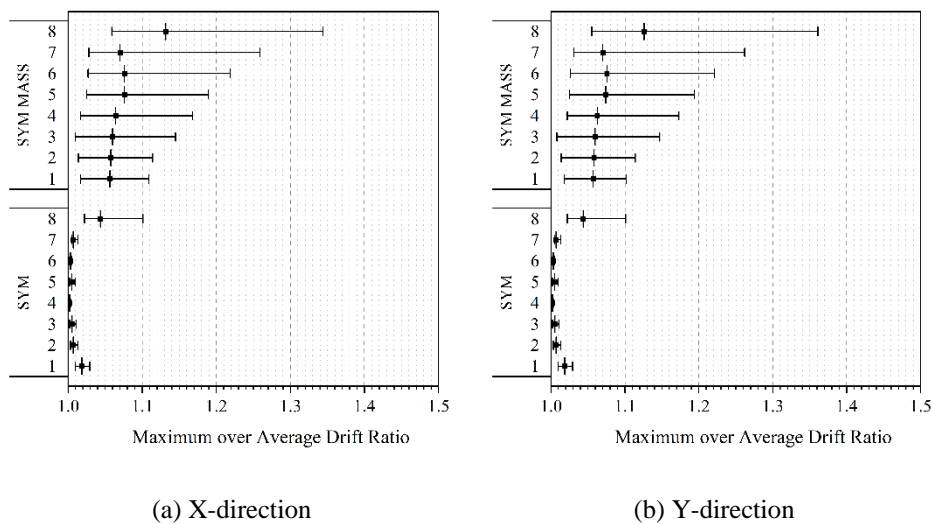
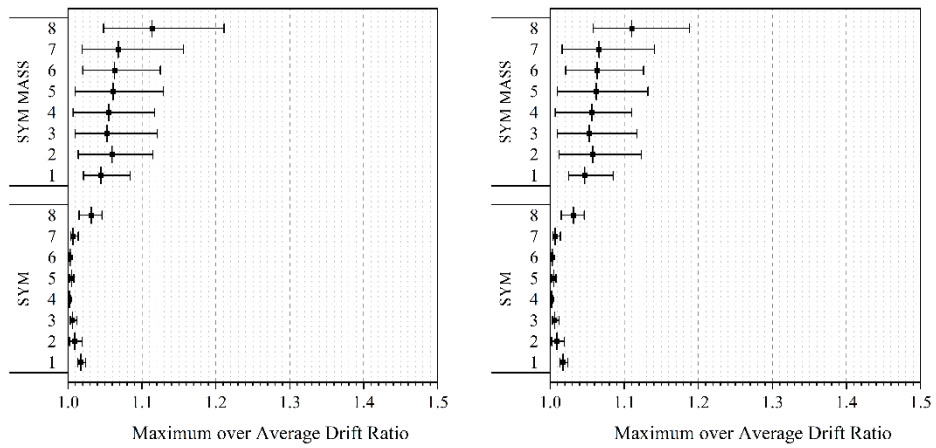


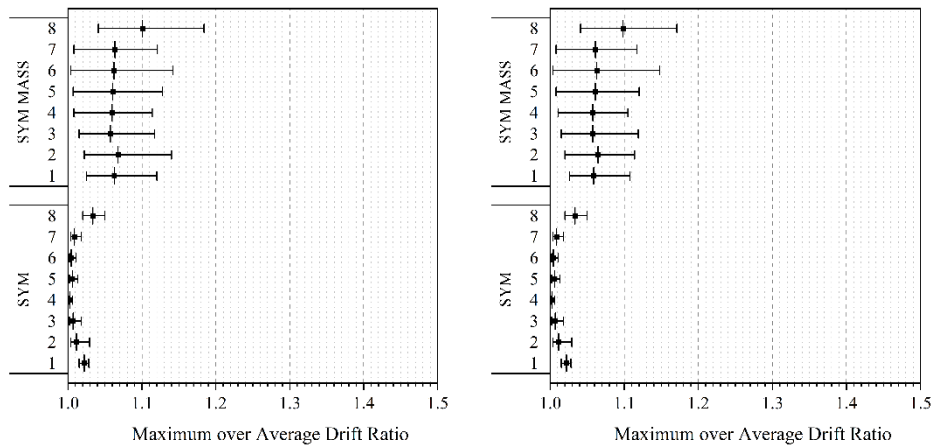
Figure 5.14 Variation of maximum drift to average drift ratios for Symmetric and Symmetric-Mass models (Site Class A)



(a) X-direction

(b) Y-direction

Figure 5.15. Variation of maximum drift to average drift ratios for Symmetric and Symmetric-Mass models (Site Class C)



(a) X-direction

(b) Y-direction

Figure 5.16 Variation of maximum drift to average drift ratios for Symmetric and Symmetric-Mass models (Site Class D)

- *T4 and T4 Mass Building Comparison*

For T4 and T4 Mass buildings, the maximum displacement and average displacement ratio of each story have presented in Figure 5.17, Figure 5.18 and Figure 5.19. It is observed that mass concentrated buildings have less β values according to base models. Location of the mass concentrated region which is on the stiff side reduces the maximum over average drift ratio of each story.

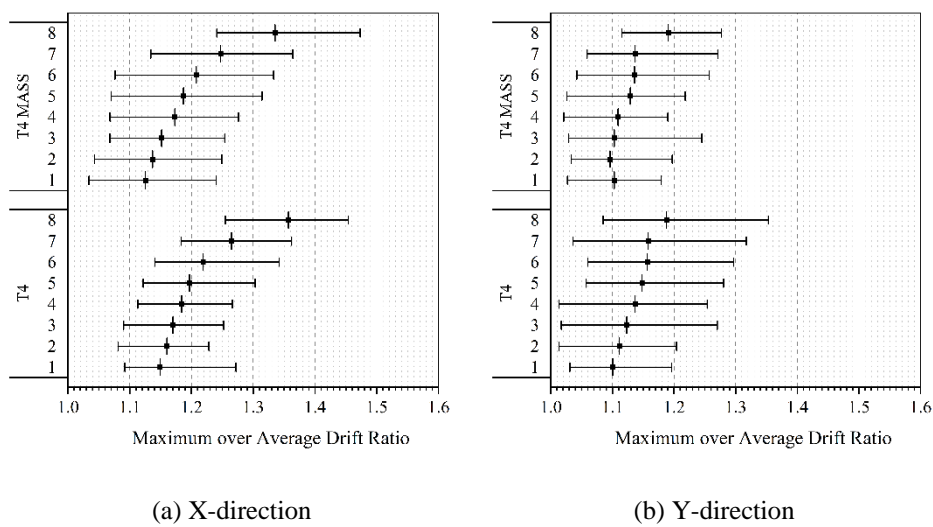
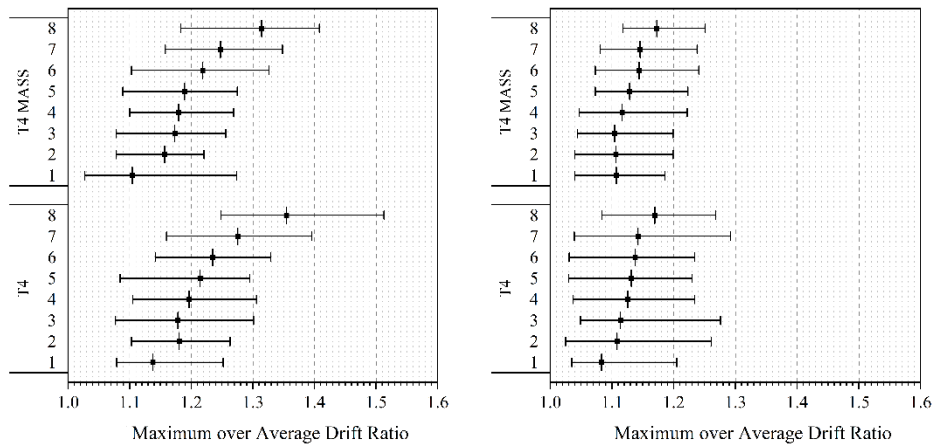


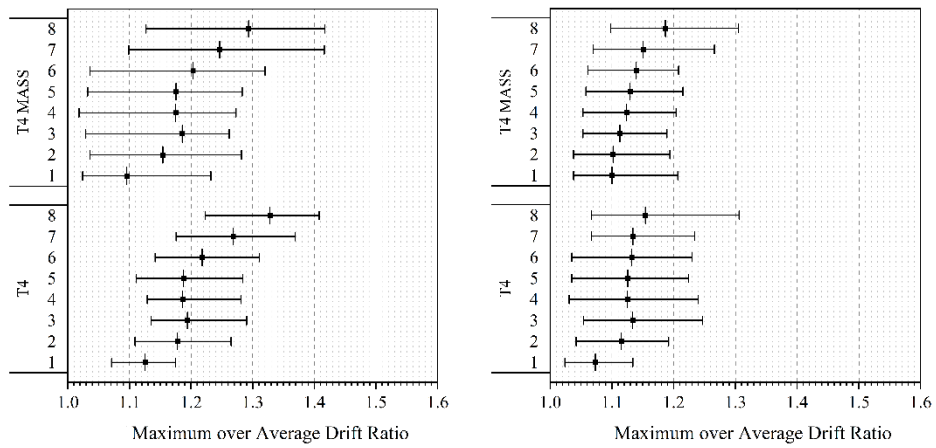
Figure 5.17 Variation of maximum drift to average drift ratios for T4 and T4-Mass models (Site Class A)



(a) X-direction

(b) Y-direction

Figure 5.18. Variation of maximum drift to average drift ratios for T4 and T4-Mass models (Site Class C)



(a) X-direction

(b) Y-direction

Figure 5.19. Variation of maximum drift to average drift ratios for T4 and T4-Mass models (Site Class D)

- *U4 and U4 Mass Building Comparison*

For U4 and U4 Mass buildings, the maximum displacement and average displacement ratio of each story have presented in Figure 5.20, Figure 5.21 and Figure 5.22. It is observed that mass concentrated buildings have higher β values according to base models. Location of the mass concentrated region which is on the flexible side increase the maximum over average drift ratio of each story.

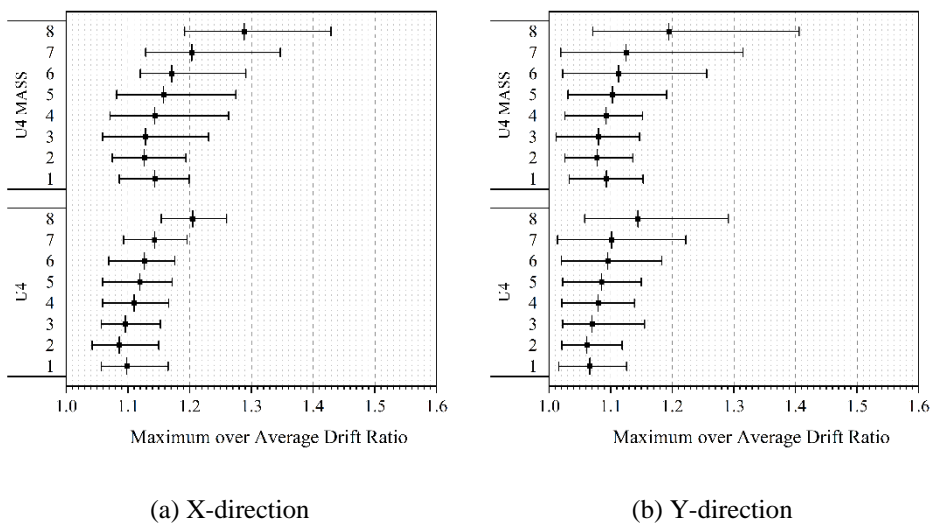
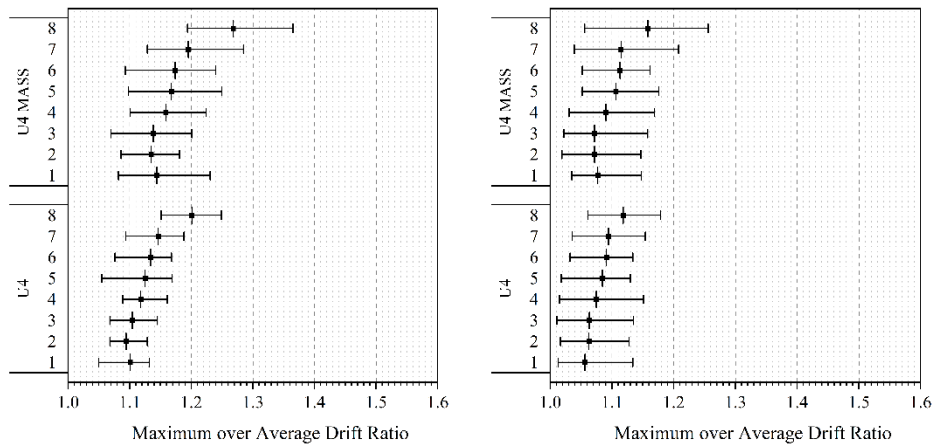


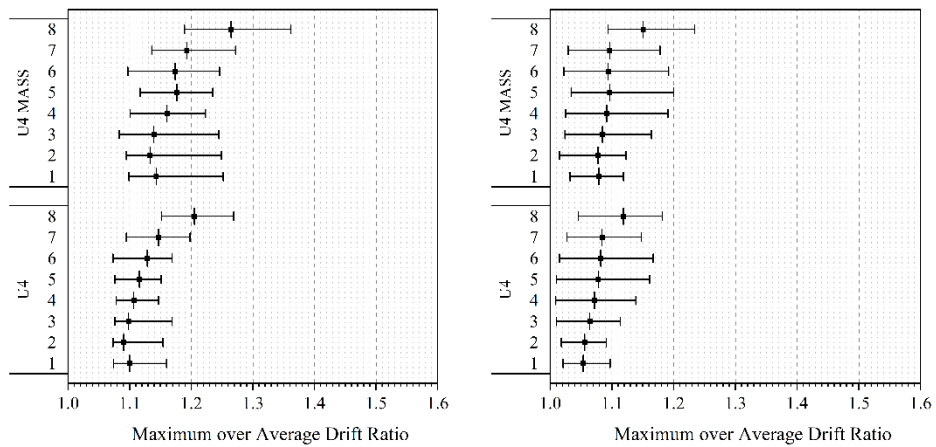
Figure 5.20. Variation of maximum drift to average drift ratios for U4 and U4-Mass models (Site Class A)



(a) X-direction

(b) Y-direction

Figure 5.21. Variation of maximum drift to average drift ratios for U4 and U4-Mass models (Site Class C)



(a) X-direction

(b) Y-direction

Figure 5.22. Variation of maximum drift to average drift ratios for U4 and U4-Mass models (Site Class D)

5.3.3 Joint drift ratio (JDR)

The joint drift ratio values for mass concentrated building set are provided in Table 5.43. Plan locations of monitored joints are displayed in Figure 4.9 and Figure 4.10. Normalized JDR ratios are shown in Table 5.44. Values of SYM Mass are normalized with SYM, T4 Mass are normalized with T4 and U4 Mass are normalized with U4 building JDR values.

At the center joint, insignificant variation of normalized JDR values has been observed for all three types of buildings. At the flexible end joint, for SYM Mass building, in X-direction (U1), JDR has decreased approximately 3% and increased approximately 3% in Y-direction (U2). For T4 Mass building, it has been observed that JDR values generally decrease (except for Site Class A) in both directions. For Site Class A, JDR values increase 2% and 7% in X and Y direction respectively. On the other hand, at Site Class D 17% and 27% decrease in X and Y direction have been observed. U4 Mass building JDR values increase approximately 1.6-4% with respect to the base model at flexible end joint. In addition, as site class characteristics get worse, JDR values tend to increase for mass concentrated part of the building. If the mass concentrated part of building has not located at the flexible side, JDR values tend to decrease as observed in T4 Mass building results.

Table 5.43 Comparison of JDR results for mass concentrated model set

	CENTER U1			CENTER U2			FLEXIBLE END U1			FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
SYM	0.146	0.193	0.216	0.148	0.201	0.207	0.156	0.200	0.199	0.161	0.196	0.160
SYM MASS	0.145	0.192	0.214	0.146	0.199	0.207	0.152	0.195	0.192	0.167	0.201	0.167
T4	0.141	0.187	0.206	0.148	0.196	0.219	0.190	0.259	0.290	0.147	0.195	0.218
T4 MASS	0.142	0.189	0.209	0.145	0.199	0.208	0.194	0.255	0.241	0.159	0.194	0.158
U4	0.145	0.190	0.215	0.137	0.184	0.197	0.181	0.229	0.234	0.152	0.183	0.154
U4 MASS	0.142	0.185	0.209	0.136	0.181	0.195	0.188	0.237	0.243	0.154	0.186	0.157

Table 5.44 Comparison of normalized JDR results for mass concentrated model set

	NORMALIZED CENTER U1			NORMALIZED CENTER U2			NORMALIZED FLEXIBLE END U1			NORMALIZED FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
SYM	-	-	-	-	-	-	-	-	-	-	-	-
SYM MASS	0.991	0.992	0.993	0.990	0.991	0.999	0.975	0.978	0.966	1.038	1.026	1.047
T4	-	-	-	-	-	-	-	-	-	-	-	-
T4 MASS	1.007	1.009	1.015	0.981	1.013	0.951	1.022	0.986	0.829	1.077	0.992	0.727
U4	-	-	-	-	-	-	-	-	-	-	-	-
U4 MASS	0.977	0.972	0.971	0.987	0.985	0.991	1.041	1.032	1.040	1.016	1.016	1.022

5.3.4 Peak floor acceleration (PFA)

Peak floor acceleration base profiles for mass concentrated model sets have been given between Figure 5.23, Figure 5.24 and Figure 5.25. It is observed that the story acceleration increases for the mass concentrated buildings. Mean and MIDR values PFA responses have been presented comparatively in detail in Table 5.45, Table 5.46 and Table 5.47 for three main building.

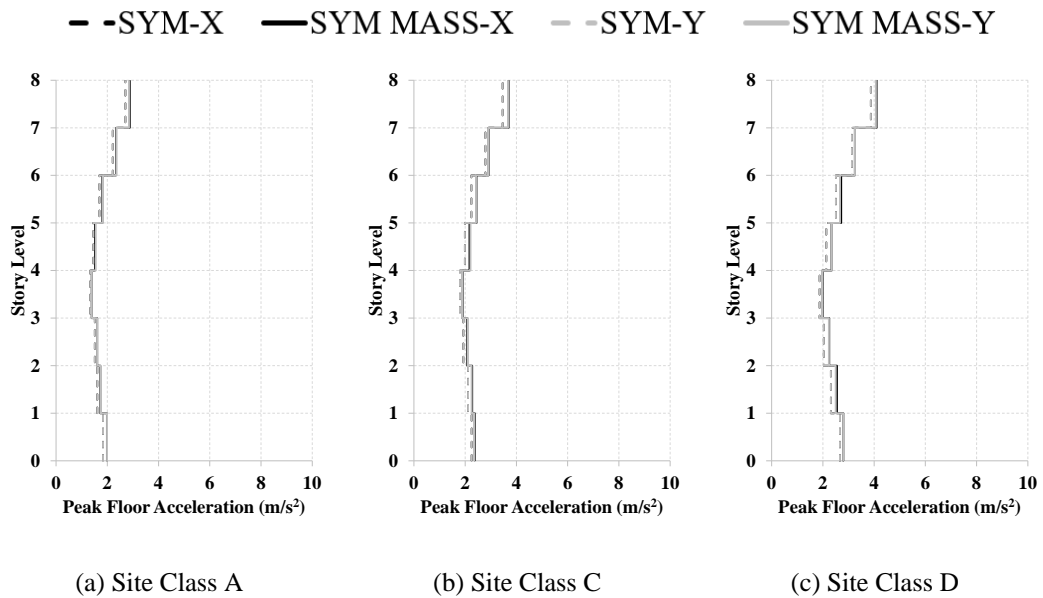


Figure 5.23. Comparison of PFA profiles for Symmetric and Symmetric-Mass models

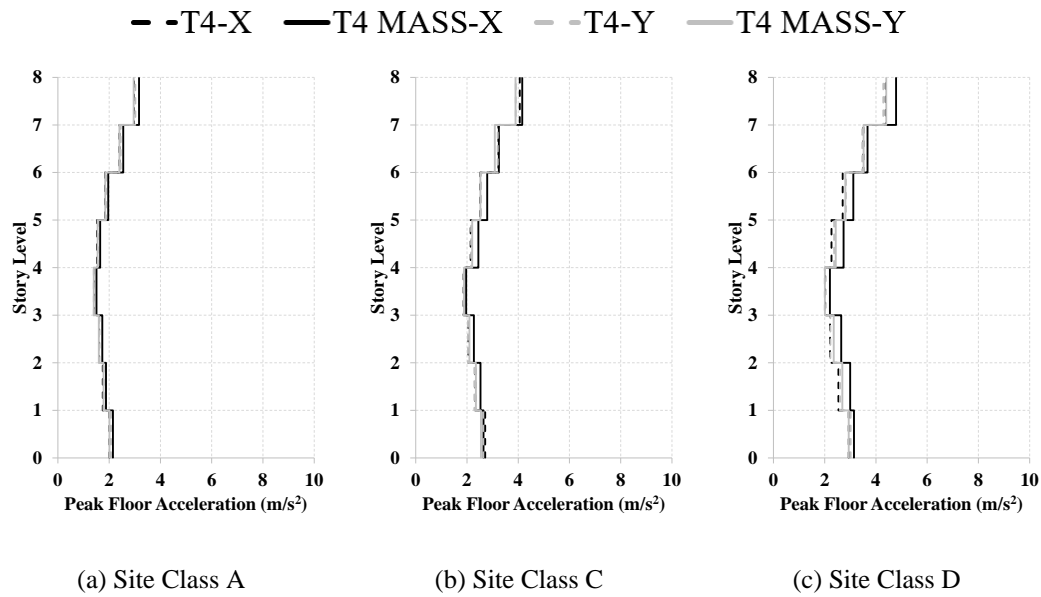


Figure 5.24. Comparison of PFA profiles for T4 and T4-Mass models

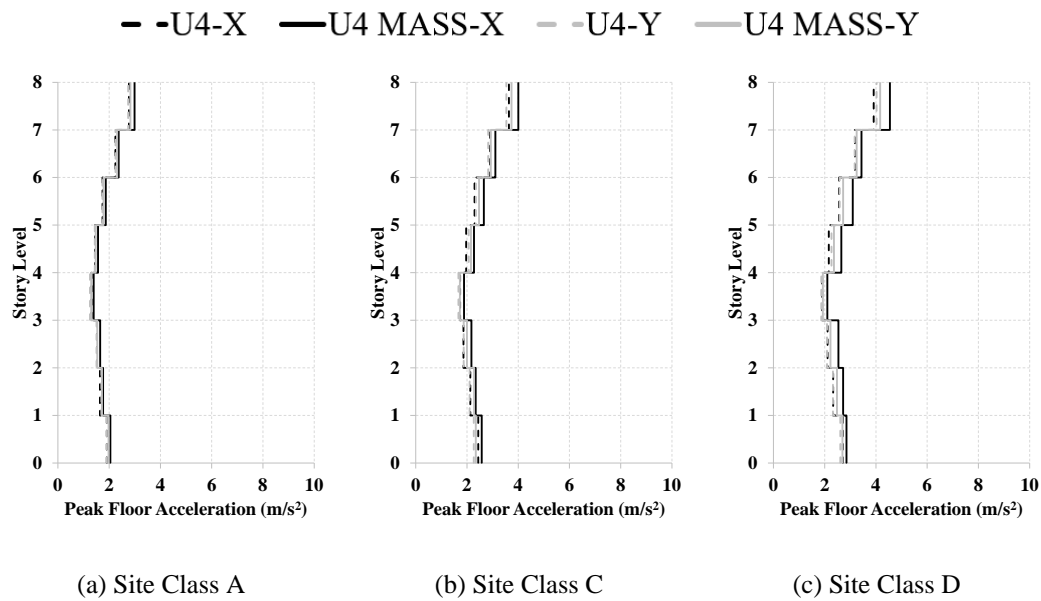


Figure 5.25. Comparison of PFA profiles for U4 and U4-Mass models

Table 5.45 Comparison of PFA results for Symmetric and Symmetric-Mass models
for Site Class A

SC A	<u>SYM-X</u>	<u>SYMM-X</u>	<u>SYMM-X</u>	<u>SYM-Y</u>	<u>SYMM-Y</u>	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	1.834	1.983	1.082	1.834	1.988	1.084
2	1.609	1.727	1.073	1.609	1.735	1.078
3	1.515	1.603	1.058	1.515	1.603	1.058
4	1.334	1.392	1.044	1.334	1.397	1.048
5	1.453	1.520	1.046	1.453	1.548	1.065
6	1.693	1.805	1.066	1.693	1.822	1.076
7	2.215	2.345	1.059	2.215	2.357	1.064
8	2.706	2.876	1.063	2.706	2.845	1.051
Min	-	-	1.044	-	-	1.048
Max	-	-	1.082	-	-	1.084
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MFA	2.706	2.876	1.063	2.706	2.845	1.051

SC C	<u>SYM-X</u>	<u>SYMM-X</u>	<u>SYMM-X</u>	<u>SYM-Y</u>	<u>SYMM-Y</u>	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	2.251	2.376	1.055	2.251	2.354	1.046
2	2.113	2.276	1.077	2.113	2.251	1.065
3	1.928	2.082	1.080	1.928	2.110	1.094
4	1.799	1.896	1.054	1.799	1.879	1.044
5	1.990	2.171	1.091	1.990	2.208	1.109
6	2.244	2.440	1.087	2.244	2.421	1.079
7	2.789	2.914	1.045	2.789	2.907	1.043
8	3.462	3.692	1.066	3.462	3.673	1.061
Min	-	-	1.045	-	-	1.043
Max	-	-	1.091	-	-	1.109
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MFA	3.462	3.692	1.066	3.462	3.673	1.061

SC D	<u>SYM-X</u>	<u>SYMM-X</u>	<u>SYMM-X</u>	<u>SYM-Y</u>	<u>SYMM-Y</u>	<u>SYMM-Y</u>
	Mean	Mean	SYM-X	Mean	Mean	SYM-Y
1	2.669	2.797	1.048	2.669	2.794	1.047
2	2.313	2.551	1.103	2.313	2.499	1.081
3	2.036	2.249	1.104	2.036	2.237	1.098
4	1.872	1.988	1.062	1.872	1.970	1.053
5	2.135	2.338	1.095	2.135	2.350	1.100
6	2.511	2.716	1.082	2.511	2.668	1.063
7	3.133	3.248	1.037	3.133	3.252	1.038
8	3.875	4.094	1.057	3.875	4.068	1.050
Min	-	-	1.037	-	-	1.038
Max	-	-	1.104	-	-	1.100
	SYM-X	SYMM-X	Ratio	SYM-Y	SYMM-Y	Ratio
MFA	3.875	4.094	1.057	3.875	4.068	1.050

Table 5.46 Comparison of PFA results for T4 and T4-Mass models

SC A	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	2.010	2.148	1.069	2.074	2.013	0.970
2	1.751	1.875	1.071	1.788	1.780	0.996
3	1.611	1.731	1.075	1.604	1.595	0.994
4	1.409	1.503	1.066	1.401	1.399	0.998
5	1.527	1.650	1.081	1.564	1.550	0.992
6	1.837	1.963	1.069	1.878	1.847	0.983
7	2.400	2.548	1.061	2.450	2.399	0.979
8	2.971	3.164	1.065	3.019	2.955	0.979
Min	-	-	1.061	-	-	0.970
Max	-	-	1.081	-	-	0.998
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MFA	2.971	3.171	1.067	3.019	2.959	0.980

SC C	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	2.709	2.645	0.976	2.631	2.545	0.967
2	2.328	2.529	1.087	2.286	2.349	1.027
3	2.056	2.269	1.104	2.038	2.096	1.029
4	1.869	1.968	1.053	1.878	1.884	1.003
5	2.141	2.444	1.141	2.161	2.205	1.020
6	2.517	2.790	1.108	2.551	2.523	0.989
7	3.225	3.246	1.006	3.200	3.084	0.964
8	4.062	4.156	1.023	3.905	3.894	0.997
Min	-	-	0.976	-	-	0.964
Max	-	-	1.141	-	-	1.029
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MFA	4.062	4.156	1.023	3.905	3.894	0.997

SC D	T4-X	T4M-X	<u>T4M-X</u>	T4-Y	T4M-Y	<u>T4M-Y</u>
	Mean	Mean	T4-X	Mean	Mean	T4-Y
1	2.939	3.142	1.069	3.014	2.940	0.975
2	2.536	2.994	1.180	2.596	2.690	1.036
3	2.206	2.646	1.199	2.220	2.351	1.059
4	2.021	2.203	1.090	2.003	2.007	1.002
5	2.266	2.738	1.209	2.371	2.433	1.026
6	2.700	3.115	1.154	2.830	2.809	0.993
7	3.509	3.672	1.046	3.467	3.520	1.015
8	4.382	4.786	1.092	4.290	4.404	1.027
Min	-	-	1.046	-	-	0.975
Max	-	-	1.209	-	-	1.059
	T4-X	T4M-X	Ratio	T4-Y	T4M-Y	Ratio
MFA	4.382	4.786	1.092	4.290	4.404	1.027

Table 5.47 Comparison of PFA results for U4 and U4-Mass models

SC A	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	1.905	2.046	1.074	1.909	1.975	1.035
2	1.640	1.762	1.074	1.696	1.717	1.013
3	1.521	1.650	1.085	1.508	1.534	1.018
4	1.314	1.398	1.063	1.252	1.301	1.039
5	1.454	1.565	1.076	1.440	1.476	1.025
6	1.741	1.867	1.072	1.737	1.779	1.024
7	2.241	2.371	1.058	2.250	2.313	1.028
8	2.774	2.992	1.079	2.742	2.831	1.032
Min	-	-	1.058	-	-	1.013
Max	-	-	1.085	-	-	1.039
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MFA	2.774	2.992	1.079	2.742	2.831	1.032

SC C	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	2.438	2.575	1.056	2.264	2.345	1.036
2	2.131	2.340	1.099	2.104	2.277	1.082
3	1.865	2.175	1.166	1.874	1.999	1.066
4	1.731	1.887	1.090	1.667	1.725	1.034
5	1.966	2.272	1.156	2.067	2.158	1.044
6	2.296	2.658	1.158	2.350	2.472	1.052
7	2.901	3.111	1.072	2.828	2.928	1.035
8	3.635	4.005	1.102	3.538	3.740	1.057
Min	-	-	1.056	-	-	1.034
Max	-	-	1.166	-	-	1.082
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MFA	3.635	4.005	1.102	3.538	3.740	1.057

SC D	U4-X	U4M-X	U4M-X	U4-Y	U4M-Y	U4M-Y
	Mean	Mean	U4-X	Mean	Mean	U4-Y
1	2.707	2.851	1.053	2.612	2.694	1.031
2	2.330	2.721	1.168	2.321	2.478	1.068
3	2.111	2.537	1.202	2.090	2.226	1.065
4	1.902	2.104	1.106	1.865	1.928	1.034
5	2.158	2.650	1.228	2.263	2.362	1.044
6	2.562	3.095	1.208	2.582	2.720	1.053
7	3.183	3.437	1.080	3.170	3.247	1.024
8	3.914	4.546	1.161	4.025	4.167	1.035
Min	-	-	1.053	-	-	1.024
Max	-	-	1.228	-	-	1.068
	U4-X	U4M-X	Ratio	U4-Y	U4M-Y	Ratio
MFA	3.914	4.546	1.161	4.025	4.167	1.035

5.4 Evaluation of Isolator Group Effect with Different Isolator Configurations

Three different models have been prepared based on the Type U4 model with different isolator group numbers. The first model has one group, the second has three groups and the third model has five different types LRB isolator groups. Results are evaluated for the 3 models mentioned above to display the isolator group effect on seismic response of the superstructure with horizontal irregularity. In addition to fundamental engineering demand parameters, isolator characteristics and hysteresis curves are compared. Hysteresis behavior represents the isolator demand for various models.

5.4.1 Interstory drift ratio (IDR)

IDR profiles are displayed in Figure 5.26 according to three different Site Classes. The variation in the results has been numerically presented in between Table 5.48 to Table 5.53. In these comparison tables, mean IDR results and ratios calculated by normalizing the results with U4 GR3 based values are tabulated where mean IDR values were computed considering the results of 22 ground motion records which are presented in between Table A.73 to Table A.84 in Appendix A.

It can be observed that various isolator group number does not affect the IDR demands. The mean IDR results of 3 buildings are almost the same and the normalized values are approximately 1 as presented in between Table 5.48 to Table 5.53. The observation of IDR demands is valid for both X and Y-direction. Isolator group variations do not significantly affect the IDR responses of the structure.

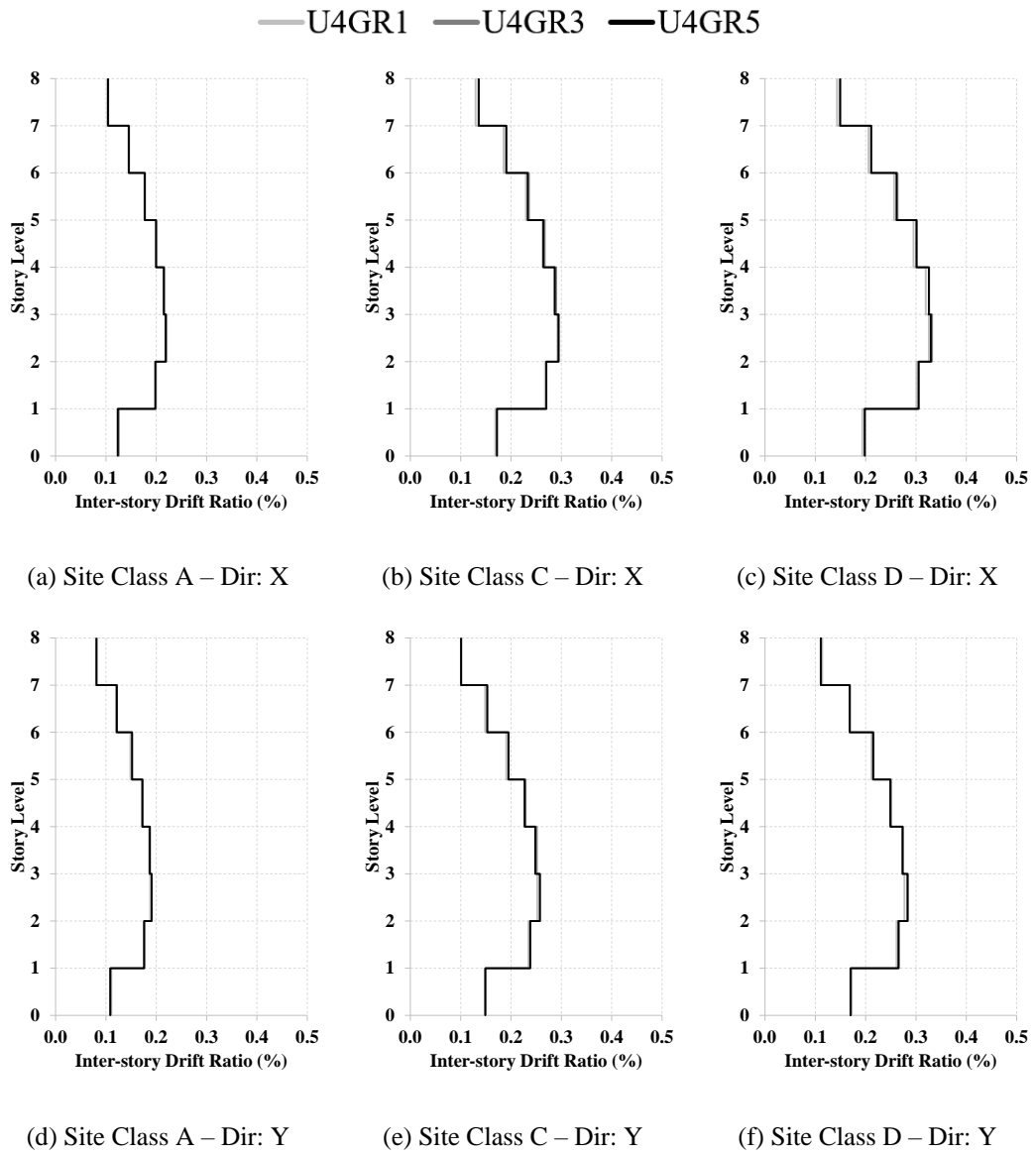


Figure 5.26. Comparison of IDR (in %) profiles for U4 – Group 1, 3 and 5 models

Table 5.48 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC A – Dir: X)

SC A	U4GR1		U4GR3	U4GR5	
X	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.123	0.981	0.126	0.124	0.983
2	0.199	0.995	0.199	0.198	0.993
3	0.218	0.991	0.220	0.219	0.994
4	0.214	0.992	0.216	0.215	0.997
5	0.199	0.995	0.200	0.200	0.997
6	0.176	0.992	0.178	0.177	0.997
7	0.145	0.992	0.146	0.145	0.994
8	0.102	0.978	0.105	0.104	0.995
Min	-	0.978	-	-	0.983
Max	-	0.995	-	-	0.997
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.222	0.992	0.224	0.222	0.994

Table 5.49 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC A – Dir: Y)

SC A	U4GR1		U4GR3	U4GR5	
Y	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.111	1.013	0.109	0.109	0.994
2	0.176	0.999	0.176	0.176	0.997
3	0.188	0.985	0.191	0.191	1.000
4	0.186	0.990	0.187	0.187	0.999
5	0.171	0.989	0.173	0.173	0.997
6	0.149	0.979	0.152	0.152	1.000
7	0.120	0.991	0.121	0.122	1.008
8	0.081	1.009	0.080	0.081	1.012
Min	-	0.979	-	-	0.994
Max	-	1.013	-	-	1.012
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.193	0.993	0.194	0.194	0.998

Table 5.50 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC C – Dir: X)

SC C	U4GR1		U4GR3	U4GR5	
	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.169	0.981	0.172	0.172	0.999
2	0.268	0.992	0.270	0.270	1.002
3	0.292	0.989	0.295	0.294	0.997
4	0.286	0.987	0.290	0.287	0.991
5	0.263	0.984	0.267	0.264	0.990
6	0.230	0.974	0.236	0.233	0.989
7	0.185	0.968	0.191	0.190	0.996
8	0.129	0.956	0.135	0.136	1.005
Min	-	0.956	-	-	0.989
Max	-	0.992	-	-	1.005
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.295	0.989	0.298	0.297	0.996

Table 5.51 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC C – Dir: Y)

SC C	U4GR1		U4GR3	U4GR5	
	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.150	1.006	0.149	0.149	1.001
2	0.235	0.987	0.238	0.238	1.002
3	0.252	0.978	0.258	0.257	0.997
4	0.249	0.992	0.251	0.248	0.988
5	0.227	0.991	0.229	0.227	0.991
6	0.191	0.976	0.195	0.195	0.997
7	0.148	0.975	0.152	0.153	1.004
8	0.101	1.008	0.100	0.101	1.004
Min	-	0.975	-	-	0.988
Max	-	1.008	-	-	1.004
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.256	0.987	0.259	0.258	0.996

Table 5.52 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC D – Dir: X)

SC D	U4GR1		U4GR3	U4GR5	
X	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.194	0.974	0.199	0.198	0.997
2	0.301	0.984	0.306	0.305	0.997
3	0.326	0.981	0.332	0.330	0.993
4	0.319	0.980	0.326	0.326	0.998
5	0.295	0.977	0.302	0.301	0.997
6	0.257	0.974	0.263	0.261	0.992
7	0.206	0.973	0.211	0.211	0.997
8	0.143	0.956	0.150	0.149	0.997
Min	-	0.956	-	-	0.992
Max	-	0.984	-	-	0.998
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.333	0.983	0.338	0.338	0.998

Table 5.53 Comparison of IDR (in %) results for U4 – Group 1, 3 and 5 models
(SC D – Dir: Y)

SC D	U4GR1		U4GR3	U4GR5	
Y	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	0.172	1.009	0.171	0.170	0.995
2	0.261	0.982	0.266	0.265	0.996
3	0.277	0.975	0.284	0.283	0.996
4	0.272	0.993	0.274	0.273	0.996
5	0.248	0.992	0.251	0.249	0.994
6	0.212	0.982	0.216	0.215	0.996
7	0.169	0.999	0.169	0.168	0.994
8	0.114	1.020	0.111	0.111	0.994
Min	-	0.975	-	-	0.994
Max	-	1.020	-	-	0.996
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MIDR	0.285	0.985	0.289	0.288	0.997

5.4.2 Maximum/Average story displacement (β)

The maximum displacement and average displacement ratio of each story for Site Class A have presented in Figure 5.27. It is observed that all models have close the β values. In addition, it is observed that the roof story has 7% higher β value compared to Story 7.

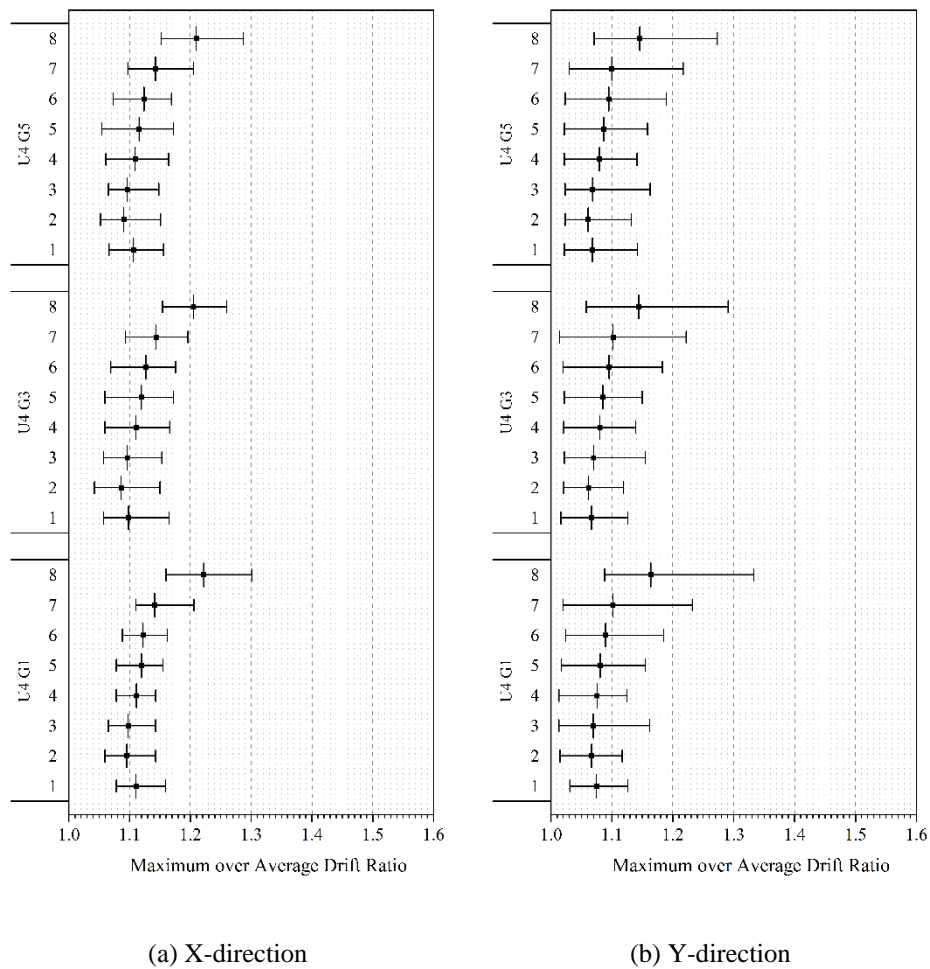
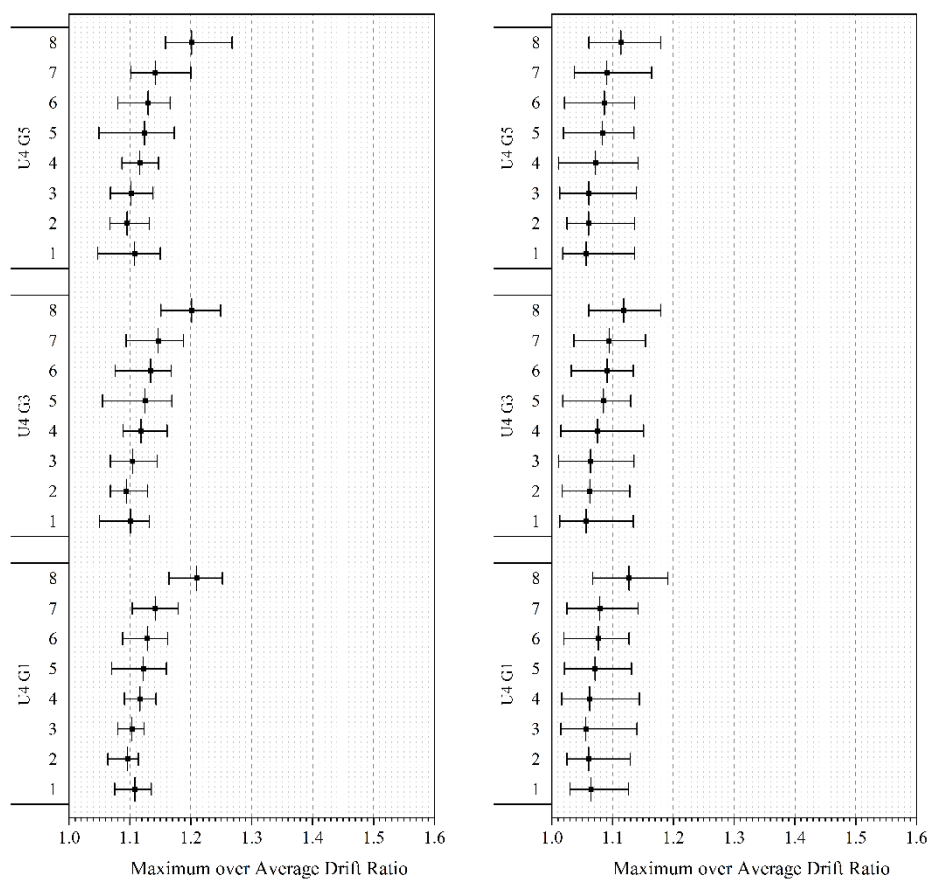


Figure 5.27. Variation of maximum drift to average drift ratios for U4 – Group 1, 3 and 5 models (Site Class A)

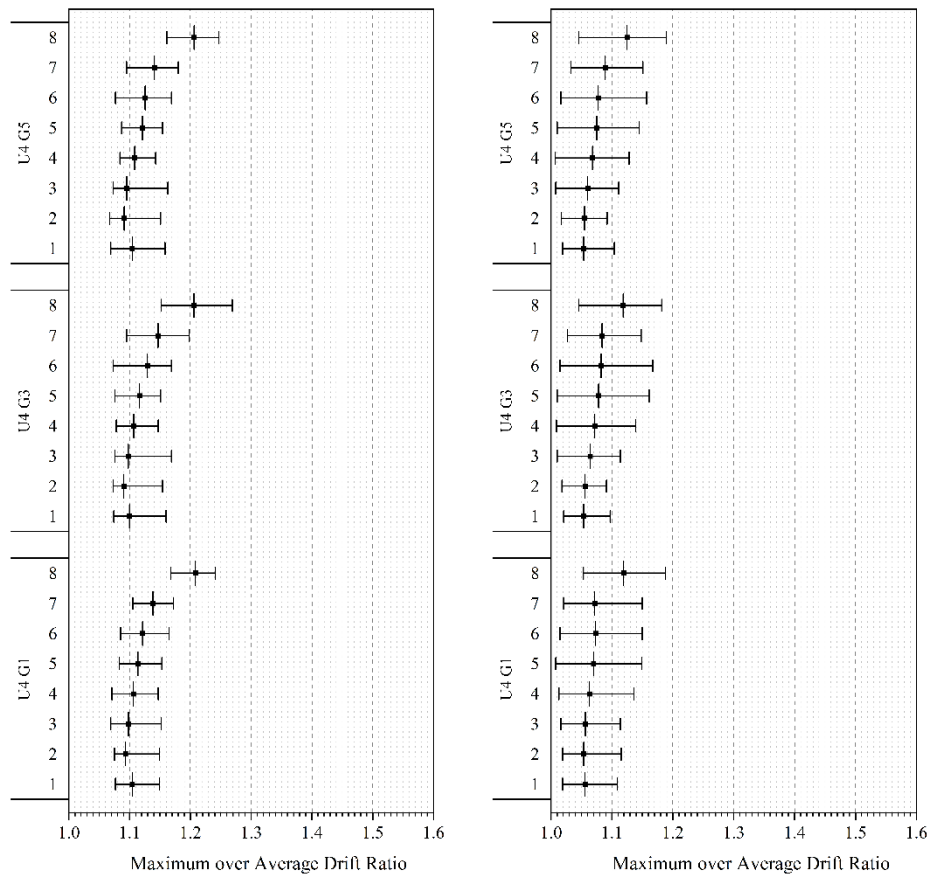


(a) X-direction

(b) Y-direction

Figure 5.28. Variation of CM maximum drift to average drift ratios for U4 – Group 1, 3 and 5 models (Site Class C)

Figure 5.28 presents the maximum displacement and average displacement ratio of each story for Site Class C have presented It is clear that all models have nearly close β values. Similarly, as the Site Class A results mentioned above, Story 8 has 7% higher β value compared to Story 7.



(a) X-direction

(b) Y-direction

Figure 5.29 Variation of CM maximum drift to average drift ratios for U4 – Group 1, 3 and 5 models (Site Class D)

The same observation mentioned above for Site Class A and Site Class C is also valid for Site Class D results. The maximum displacement and average displacement ratio of each story for Site Class D have presented in Figure 5.29. It is observed that all models have nearly close the β values and roof story β values increase 7% compared to one story below for all Site Classes

5.4.3 Joint drift ratio (JDR)

The joint drift ratio values for three models with different isolator group numbers have been provided in Table 5.54. JDR values have been normalized with U4 GR3 and results are given in Table 5.55. It is observed that JDR is not significantly affected by the number of isolator groups.

Table 5.54 Comparison of JDR results for U4 – Group 1, 3 and 5 models

	CENTER U1			CENTER U2			FLEXIBLE END U1			FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
U4 GR1	0.142	0.186	0.211	0.136	0.182	0.195	0.178	0.225	0.227	0.150	0.180	0.151
U4 GR3	0.145	0.190	0.215	0.137	0.184	0.197	0.181	0.229	0.234	0.152	0.183	0.154
U4 GR5	0.145	0.189	0.214	0.137	0.185	0.197	0.179	0.228	0.231	0.151	0.183	0.152

Table 5.55 Comparison of normalized JDR results for U4 – Group 1, 3 and 5 models

	NORMALIZED CENTER U1			NORMALIZED CENTER U2			NORMALIZED FLEXIBLE END U1			NORMALIZED FLEXIBLE END U2		
	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD	ZA	ZC	ZD
U4 GR1	0.981	0.981	0.983	0.988	0.986	0.986	0.984	0.982	0.974	0.984	0.983	0.981
U4 GR3	-	-	-	-	-	-	-	-	-	-	-	-
U4 GR5	0.997	0.996	0.996	0.997	1.003	0.996	0.993	0.995	0.989	0.993	0.996	0.991

5.4.4 Base shear ratio (BSR)

The base shear ratio for three models with different isolator group numbers has been provided in Table 5.56. BSR is not affected from the number of isolator groups.

Table 5.56 Comparison of BSR results for U4 – Group 1, 3 and 5 models

SITE CLASS	BLDG	U4 GR1	Ratio	U4 GR3	U4 GR5	Ratio
	DIR	(1)	(1) / (2)	(2)	(3)	(3) / (2)
A	X	0.080	1.000	0.080	0.080	1.006
	Y	0.080	0.998	0.080	0.080	1.006
C	X	0.101	1.000	0.101	0.101	1.007
	Y	0.101	0.997	0.101	0.102	1.006
D	X	0.124	0.999	0.124	0.125	1.005
	Y	0.123	0.995	0.124	0.125	1.005

5.4.5 Peak floor acceleration (PFA)

Peak floor acceleration base profiles for three model with different isolator group number has been provided in Figure 5.30. Variation of isolation group number does not affect the PFA demand of building.

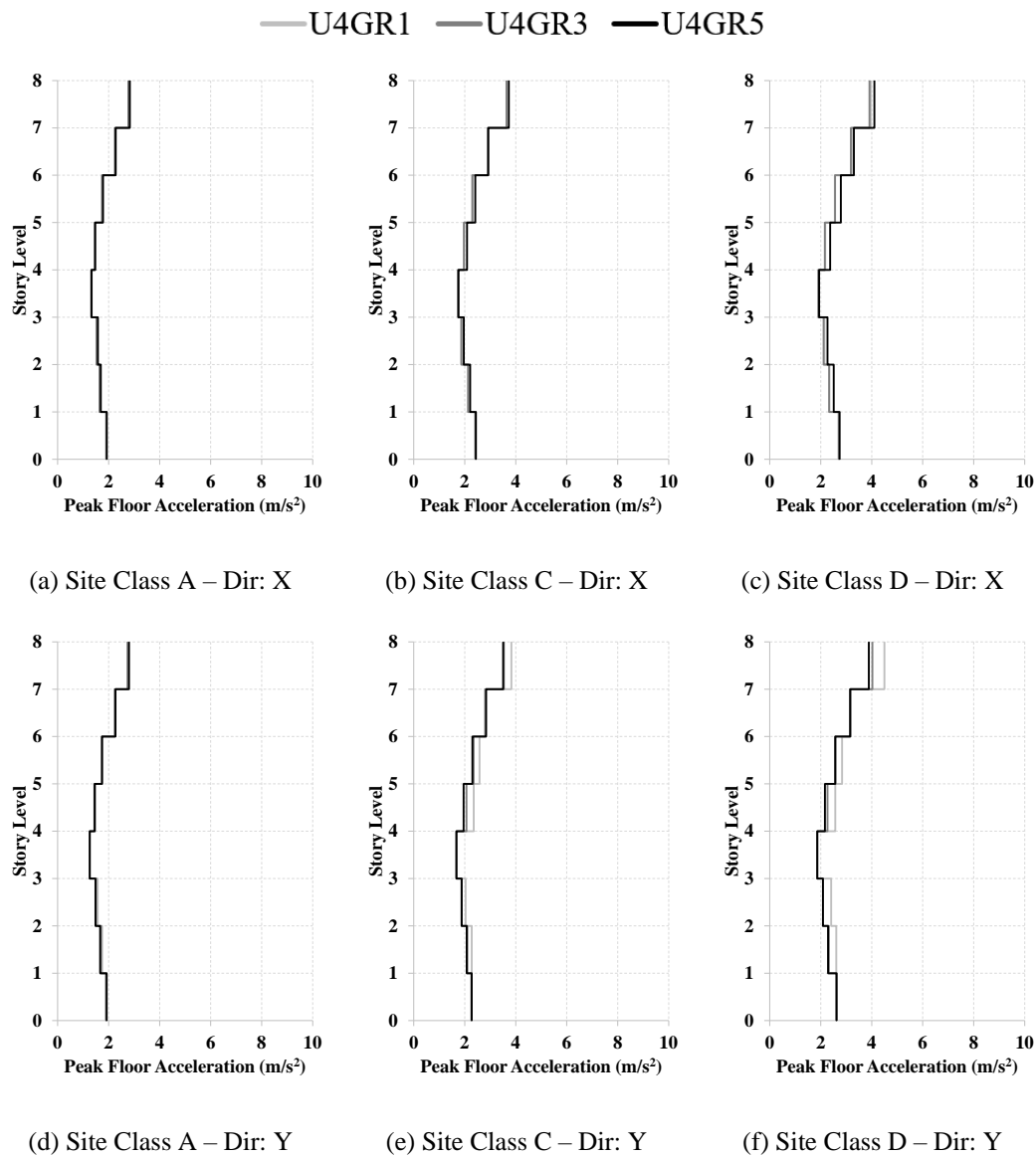


Figure 5.30. Comparison of PFA profiles for U4 – Group 1, 3 and 5 models

The PFA results and normalized values for various isolator group numbers are given in a tabular way detailed in Table 5.57 to Table 5.62 for different site classes. Numerical values also verify the similar response of buildings with various isolator groups. Normalized results are nearly close to 1. These observations are valid for all three site classes.

Table 5.57 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC A – Dir: X)

SC A	U4GR1		U4GR3	U4GR5	
X	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	1.900	0.998	1.905	1.927	1.012
2	1.648	1.005	1.640	1.692	1.032
3	1.546	1.017	1.521	1.580	1.039
4	1.339	1.019	1.314	1.328	1.010
5	1.462	1.006	1.454	1.476	1.015
6	1.744	1.002	1.741	1.779	1.022
7	2.288	1.021	2.241	2.273	1.014
8	2.828	1.020	2.774	2.831	1.020
Min	-	0.998	-	-	1.010
Max	-	1.021	-	-	1.039
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	2.828	1.020	2.774	2.831	1.020

Table 5.58 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC A – Dir: Y)

SC A	U4GR1		U4GR3	U4GR5	
Y	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	1.879	0.984	1.909	1.922	1.007
2	1.747	1.030	1.696	1.665	0.982
3	1.572	1.043	1.508	1.485	0.985
4	1.265	1.010	1.252	1.261	1.007
5	1.486	1.032	1.440	1.453	1.009
6	1.747	1.006	1.737	1.740	1.001
7	2.226	0.990	2.250	2.270	1.009
8	2.755	1.004	2.742	2.798	1.020
Min	-	0.984	-	-	0.982
Max	-	1.043	-	-	1.020
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	2.755	1.004	2.742	2.798	1.020

Table 5.59 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC C – Dir: X)

SC C	U4GR1		U4GR3	U4GR5	
X	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	2.390	0.980	2.438	2.437	1.000
2	2.147	1.007	2.131	2.213	1.039
3	1.914	1.027	1.865	1.963	1.053
4	1.766	1.021	1.731	1.754	1.014
5	1.977	1.006	1.966	2.089	1.063
6	2.318	1.010	2.296	2.414	1.052
7	2.922	1.007	2.901	2.926	1.009
8	3.643	1.002	3.635	3.729	1.026
Min	-	0.980	-	-	1.000
Max	-	1.027	-	-	1.063
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	3.643	1.002	3.635	3.729	1.026

Table 5.60 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC C – Dir: Y)

SC C	U4GR1		U4GR3	U4GR5	
	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	2.254	0.996	2.264	2.272	1.003
2	2.275	1.082	2.104	2.078	0.988
3	2.031	1.084	1.874	1.880	1.003
4	1.686	1.011	1.667	1.676	1.005
5	2.352	1.138	2.067	1.954	0.945
6	2.582	1.099	2.350	2.301	0.979
7	2.780	0.983	2.828	2.838	1.003
8	3.828	1.082	3.538	3.506	0.991
Min	-	0.983	-	-	0.945
Max	-	1.138	-	-	1.005
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	3.828	1.082	3.538	3.506	0.991

Table 5.61 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC D – Dir: X)

SC D	U4GR1		U4GR3	U4GR5	
	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	2.700	0.998	2.707	2.741	1.012
2	2.334	1.002	2.330	2.512	1.078
3	2.149	1.018	2.111	2.263	1.072
4	1.933	1.016	1.902	1.937	1.018
5	2.176	1.008	2.158	2.371	1.099
6	2.555	0.997	2.562	2.791	1.089
7	3.216	1.010	3.183	3.302	1.037
8	3.959	1.011	3.914	4.106	1.049
Min	-	0.997	-	-	1.012
Max	-	1.018	-	-	1.099
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	3.959	1.011	3.914	4.106	1.049

Table 5.62 Comparison of PFA results for U4 – Group 1, 3 and 5 models (SC D – Dir: Y)

SC D	U4GR1		U4GR3	U4GR5	
Y	Mean	GR1/GR3	Mean	Mean	GR5/GR3
1	2.613	1.000	2.612	2.624	1.004
2	2.610	1.125	2.321	2.287	0.985
3	2.408	1.152	2.090	2.086	0.998
4	1.863	0.999	1.865	1.865	1.000
5	2.571	1.136	2.263	2.164	0.956
6	2.835	1.098	2.582	2.568	0.994
7	3.164	0.998	3.170	3.153	0.995
8	4.498	1.117	4.025	3.886	0.965
Min	-	0.998	-	-	0.956
Max	-	1.152	-	-	1.004
	U4GR1	GR1/GR3	U4GR3	U4GR5	GR5/GR3
MFA	4.498	1.117	4.025	3.886	0.965

5.4.6 Hysteresis curves of isolators

Hysteresis curves for two specific isolators for three models have been studied to evaluate the group effect from the point of isolator performance. All curves are prepared based on one specific ground motion which is EQ5 H1 for Site Class C. The first isolator which is K1 placed at the bottom left corner and the second isolator locates on the symmetry axis in Y-direction. The locations of the monitored isolators have been displayed on the ETABS plan view in Figure 5.31.

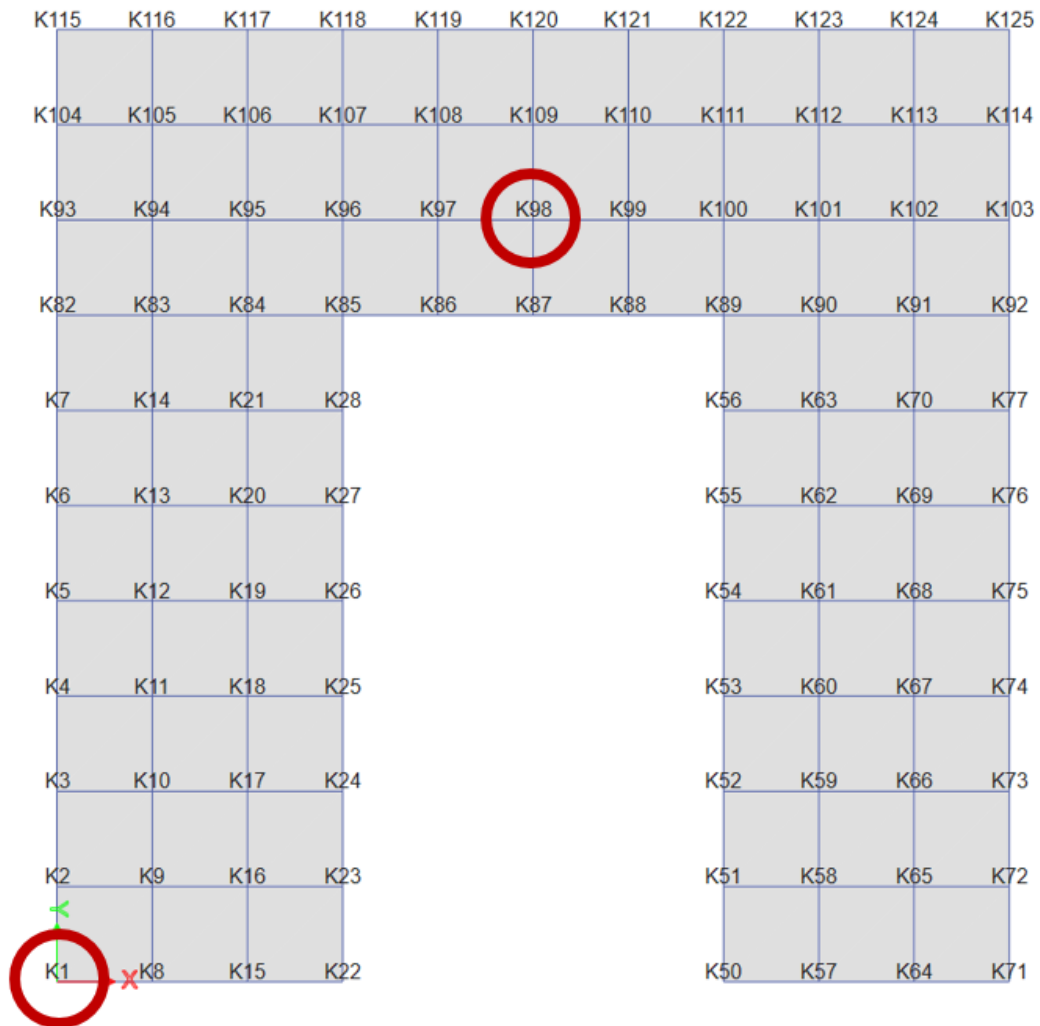


Figure 5.31. Monitored isolator locations on the plan

Monitored isolator properties which are K1 and K98, for all three grouping cases are presented in Table 5.63 and Table 5.64 respectively. Isolators have the same Q_d and K_d values but have different K_{eff} , diameter and total height. LRB properties have changed with the isolator system group properties.

Table 5.63 LRB Isolator Properties for K1 (T=3.5sec, Damping Ratio= 28%)

K1	Seismic Weigth (kN)	Q_d/W	K_d/W	K_{eff} (kN/m)	BL Lead Core Diameter (m)	B Isolator Diameter (m)	BL/B Ratio	T_r Total Rubber Height (mm)	Target Displacement (m)
For U4 GR1	4680	0.052	0.186	1537	0.176	0.90	0.196	0.535	0.33
For U4 GR3	2510	0.052	0.186	825	0.129	0.75	0.172	0.467	0.33
For U4 GR5	2510	0.052	0.186	825	0.129	0.75	0.172	0.467	0.33

Table 5.64 LRB Isolator Properties for K98 (T=3.5sec, Damping Ratio= 28%)

K98	Seismic Weigth (kN)	Q_d/W	K_d/W	K_{eff} (kN/m)	BL Lead Core Diameter (m)	B Isolator Diameter (m)	BL/B Ratio	T_r Total Rubber Height (mm)	Target Displacement (m)
For U4 GR1	4680	0.052	0.186	1537	0.176	0.90	0.196	0.535	0.33
For U4 GR3	5780	0.052	0.186	1899	0.196	0.90	0.218	0.431	0.33
For U4 GR5	5820	0.052	0.186	1912	0.197	0.90	0.218	0.428	0.33

Hysteresis curves of isolator K1 in X-direction are given in Figure 5.32, Figure 5.33 and Figure 5.34 for Group 1, Group 3 and Group 5 cases respectively. In Y-direction Figure 5.35, Figure 5.36 and Figure 5.37 present the K1 isolator properties, for Group 1, Group 3 and Group 5 cases, respectively. Various seismic weights have been used to determine the LRB characteristics due to the various number of groups defined in the isolation system. For the case Group 1, isolator K1 has the same LRB properties as all isolators in the structure, therefore K1 has the maximum stiffness compared to the other cases. For the cases of Group 3 and Group 5, K1 has the same characteristics.

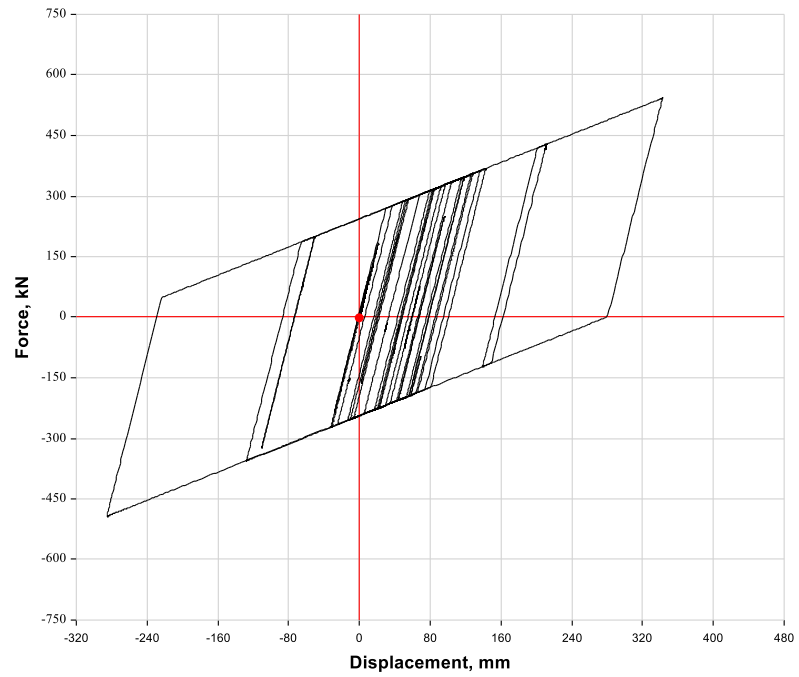


Figure 5.32. K1 hysteresis curve for U4 building with 1 group isolator (X dir.)

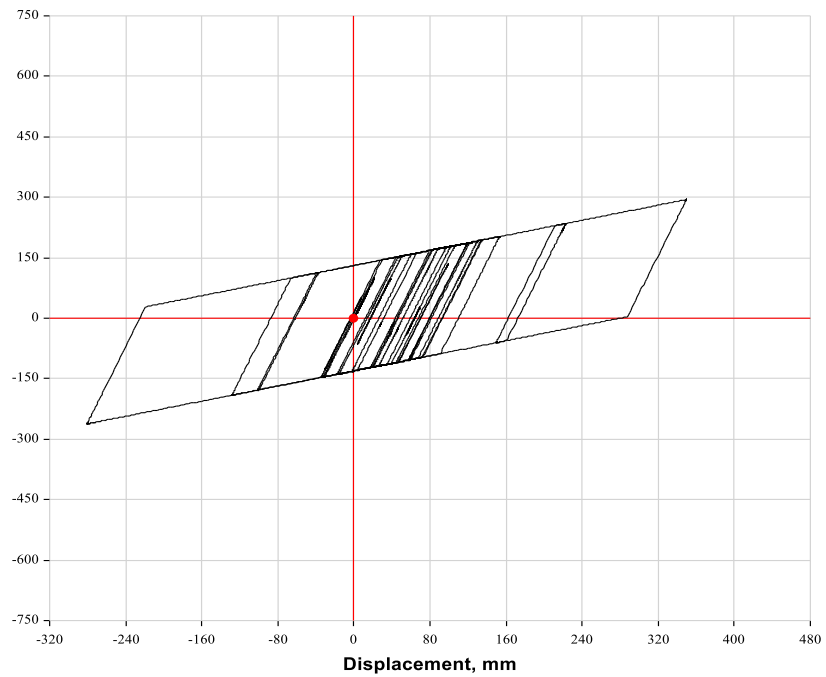


Figure 5.33. K1 hysteresis curve for U4 building with 3 group isolator (X dir.)

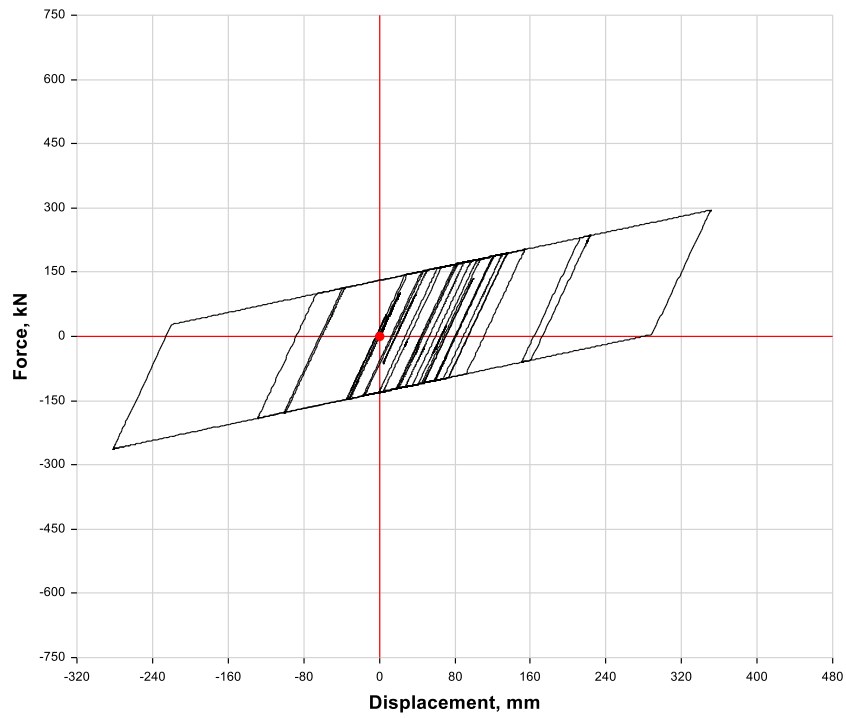


Figure 5.34. K1 hysteresis curve for U4 building with 5 group isolator (X dir.)

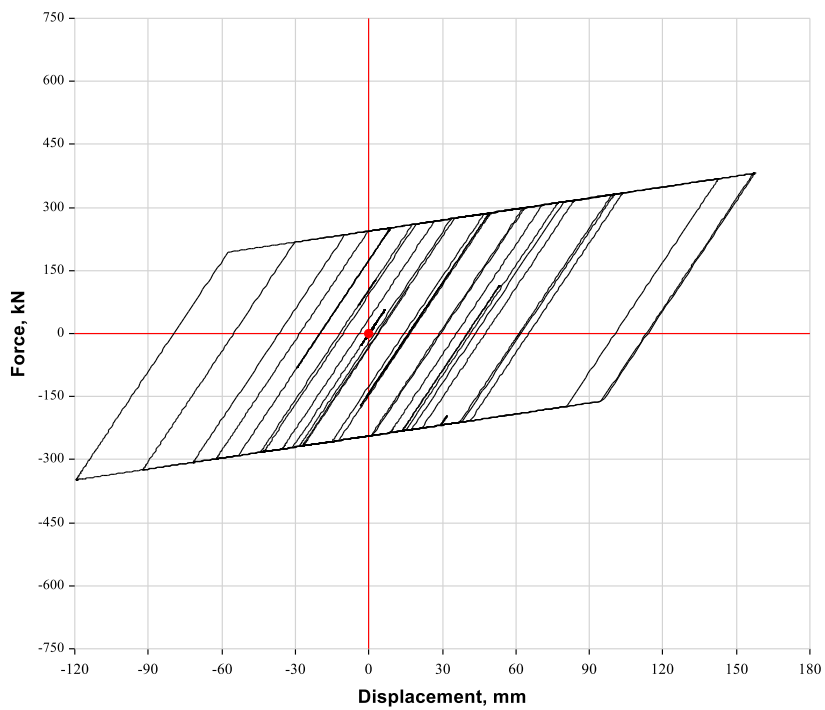


Figure 5.35. K1 hysteresis curve for U4 building with 1 group isolator (Y dir.)

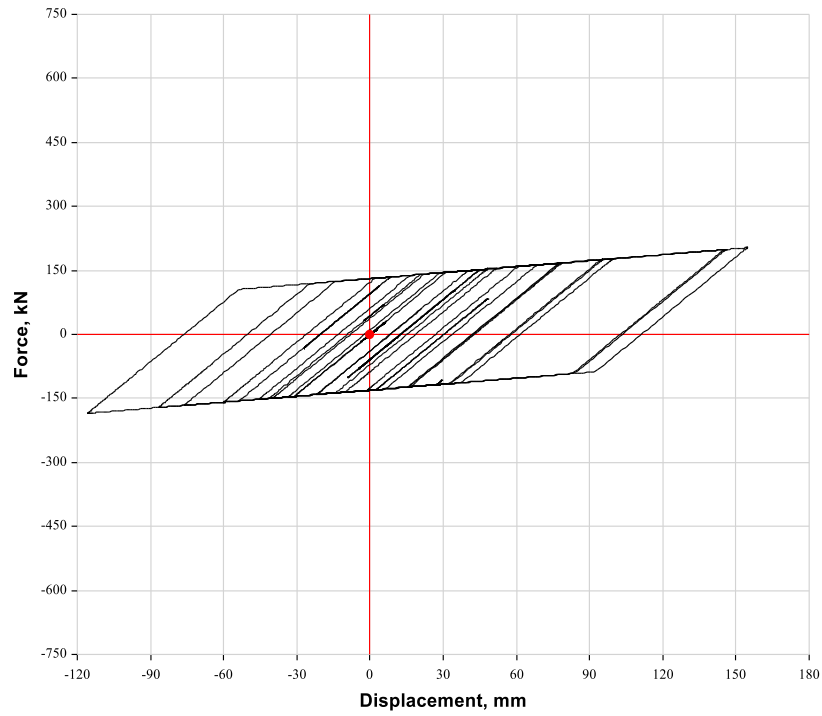


Figure 5.36. K1 hysteresis curve for U4 building with 3 group isolator (Y dir.)

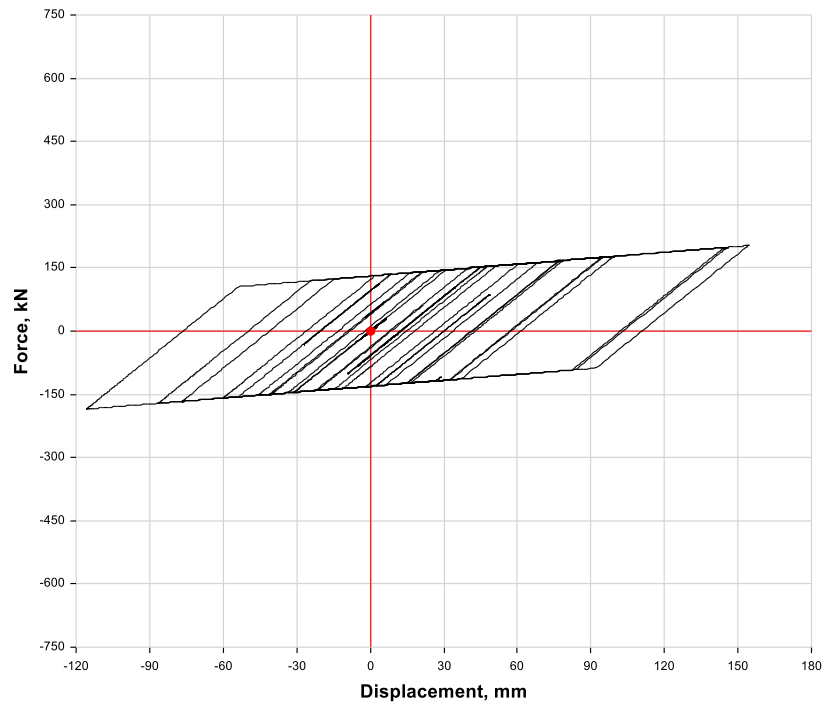


Figure 5.37. K1 hysteresis curve for U4 building with 5 group isolator (Y dir.)

In both X and Y direction for the cases Group 1, isolator K1 show high energy dissipation but for case Group 3 and Group 5, K1 has less energy dissipation behavior. Hysteresis curves of Group 3 and Group 5 cases are almost the same because they have similar isolator characteristics.

Figure 5.38, Figure 5.39 and Figure 5.40 presents the hysteresis curves of isolator K98 in X-direction for Group 1, Group 3 and Group 5 cases respectively. And also Figure 5.41, Figure 5.42 and Figure 5.43 display the hysteresis curves of isolator K98 in Y-direction. The isolator stiffness increase with the increasing group number. The isolator characteristics given in Table 5.64 are compatible with the hysteresis curves of K98. For the same displacement, Group 1 case curves given in Figure 5.38 and Figure 5.4 for both directions has the minimum force. The curves of the other two cases are almost the same because they have similar isolator characteristics. In both directions, for the case Group 1, K1 has the lowest energy dissipation behavior.

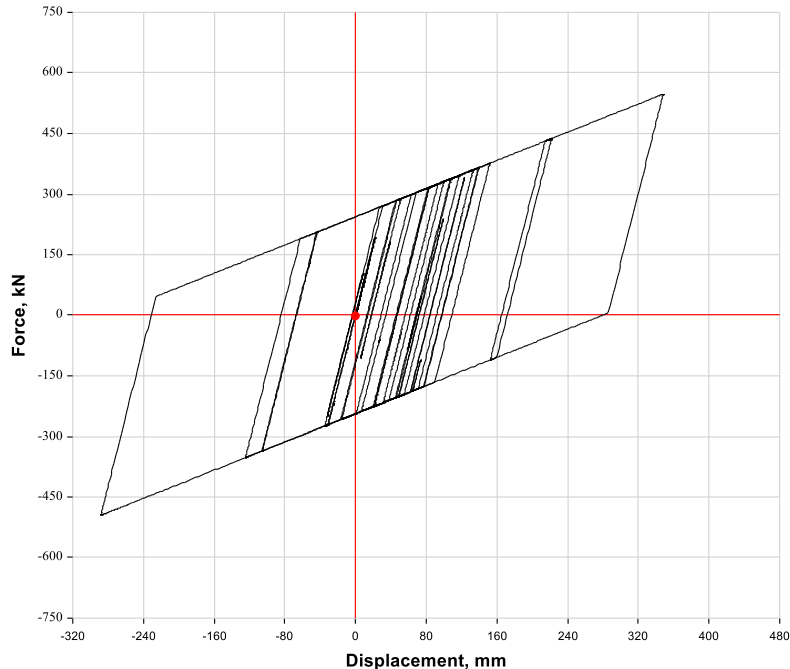


Figure 5.38. K98 hysteresis curve for U4 building with 1 group isolator (X dir.)

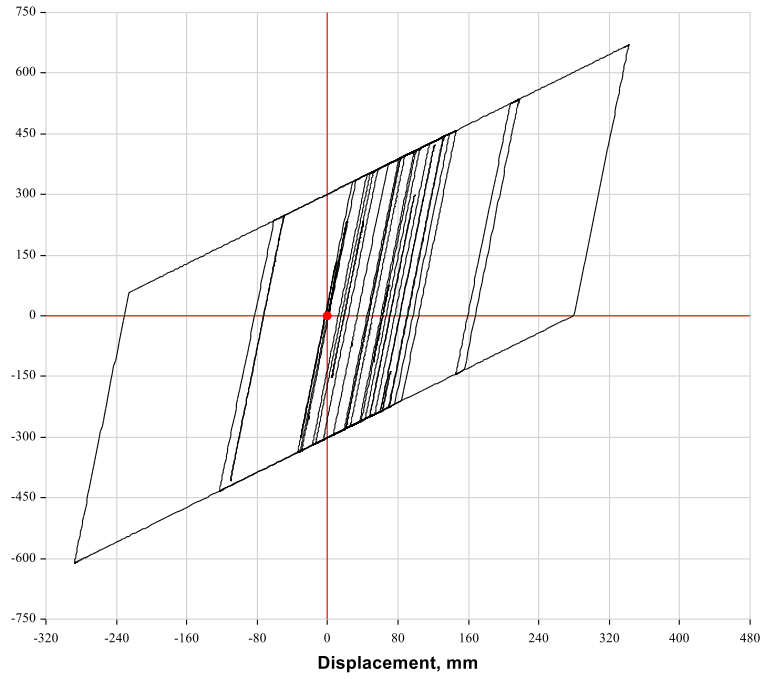


Figure 5.39. K98 hysteresis curve for U4 building with 3 group isolator (X dir.)

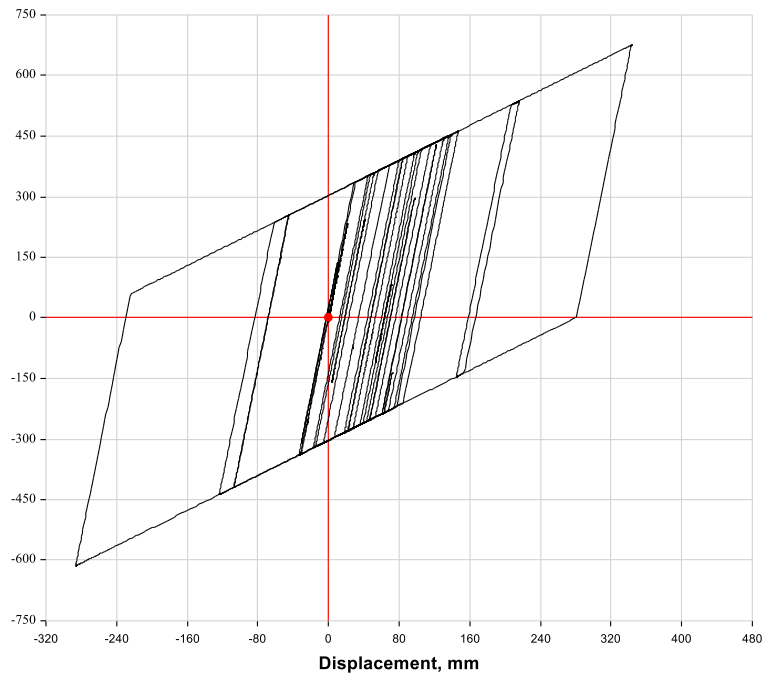


Figure 5.40. K98 hysteresis curve for U4 building with 5 group isolator (X dir.)

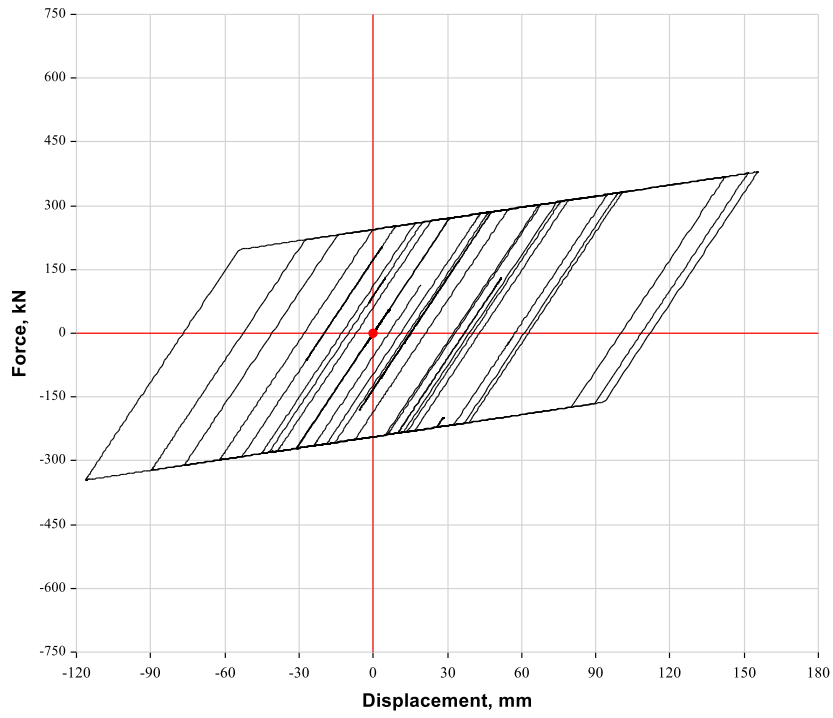


Figure 5.41. K98 hysteresis curve for U4 building with 1 group isolator (Y dir.)

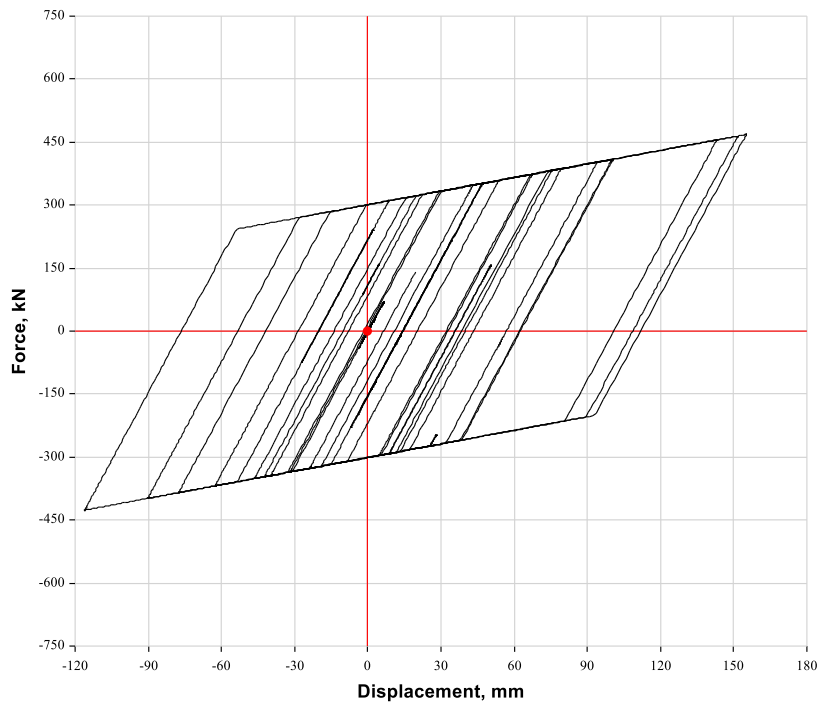


Figure 5.42. K98 hysteresis curve for U4 building with 3 group isolator (Y dir.)

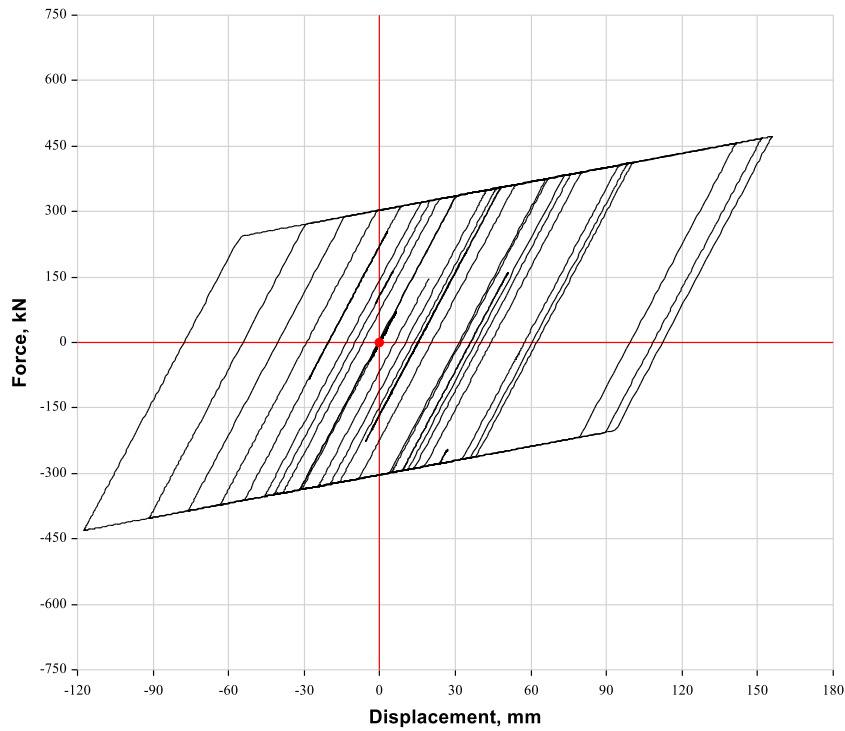


Figure 5.43. K98 hysteresis curve for U4 building with 5 group isolator (Y dir.)

The structural demands of the buildings modeled with various isolator group numbers have not changed. The grouping effect is not observed in the evaluated demand parameters. Isolator responses have changed with different isolator configurations. The seismic demand of the building is compensated with the isolation system. The isolator energy dissipation capacity depends on the isolator characteristics. The isolator with less effective stiffness shows less energy dissipation behavior and isolators with high effective stiffness dissipate higher seismic energy.

CHAPTER 6

CONCLUSIONS

In this research study, the effects of common horizontal plan irregularities at stories and base isolation distribution at the foundation level have been investigated to assess the seismic response of base isolated RC buildings with moment resisting frames. 14 different structural models analyzed with ETABS software have been utilized in this study for the evaluation of 4 different case studies. Among these structural models, T-shaped model set is composed of 4 different buildings which have been prepared with various geometrical plan irregularity ratios and masses. Similarly, 4 different U-shaped buildings have been prepared to constitute the U-shaped model set. As a reference, one symmetrical building has been included in the model set, and results of the symmetrical building have been presented along with T-shaped and U-shaped buildings. As an extension of the study, mass concentrated buildings with high geometrical plan irregularity have been also evaluated. For this section, 3 models have been generated from the T-shaped, U-shaped and Symmetrical models with mass concentration on one part of the building without altering the total mass. The final part of this study considers the isolator group effect on seismic response of a plan-irregular building. Three different isolation distributions at the foundation level have been examined for a specific U-shaped building case. As the base isolation system of all structural configurations, only LRB isolators have been considered within the scope of this study. The design of LRB isolators has been performed considering the same target period, displacement and effective damping ratio for all buildings. Nonlinear time history analyses have been performed for three distinct site classes Site Class A, Site Class C, and Site Class D, according to ASCE7-16's criteria. For each site class, 11 ground motion records have been selected and processed. In total, 33 ground motion records with 3 components

(2 horizontal and 1 vertical) have been utilized for each structural model, leading to 66 nonlinear time history cases for each building case.

It has been known in the literature and specifications that horizontal irregularities can significantly change the seismic structural response of the non-isolated buildings. The general conclusion of this study is that the base isolation system can substantially reduce the irregularity effects in seismic response of buildings even if it does not completely eliminate the negative effects, especially at the roof level of the buildings examined. It shall be also noted that as the level of irregularity increases, the change in structural response can become more pronounced to have effects pertaining to irregularities as can be significantly observed in fixed based buildings found in the literature. Detailed evaluations from the perspective of fundamental seismic demand parameters are provided below.

- IDR-based comparisons of the T- and U-shaped model sets in irregularity direction present that as the geometrical plan irregularity ratio increases from 0.1 to 0.7, IDR demand of the building also increases approximately from 15% to 60%. At roof level, these values reach approximately from 19% to 80%.
- The selected structures have symmetry only about y-axis. For the symmetry direction (i.e., Y-direction), increasing IDR demand patterns have not been observed. Since the irregularity ratio is varying along Y-direction, the structure's seismic response is expected to be affected mainly in the X-direction.
- Increasing mass does not result in increasing IDR responses in the Y-direction. This observation can be as attributed to the increase in the inertia of the structure in Y-direction.
- Considering the IDR profiles of the buildings, mean IDR values reach their maximum values at mid-height of the building as a function of moment resisting frame response in both directions.

- Irregularity and symmetry direction-based IDR observations mentioned above are valid for each site class. However, IDR demand values in both directions tend to increase from Site Class A to Site Class D as expected. Mean IDR values tend to increase approximately 40% from Site Class A to Site Class D.
- Story maximum displacement to average displacement ratio (β) is highly affected by the irregularity ratio. β value is minimum for the symmetrical building, while the buildings with higher geometrical irregularity ratios yield higher β ratios. Considering the building set with an irregularity ratio varying from the minimum to the maximum value, β ratio can increase up to 50% at some specific points. For the entire building set, β ratio computed for each story tends to increase with increasing story level and reaches the maximum value at the roof story. As the geometrical irregularity ratio increase from 0.1 to 0.7, mean β ratio at roof level increase approximately from 15% to 30%. This increase also depends on the mass and stiffness of the wings of the building and β ratio provides an indication about the flexibility of the related story and the whole building. Although both directions yield similar increasing patterns for β values, Y-direction based mean values of β (calculated for each story and each building) are generally less than the results of X-direction. All these observations are typically valid for each site class, while the numerical results tend to increase from Site Class A to Site Class D.
- It is generally observed for all buildings, as the geometric plan irregularity ratio increases from 0.1 to 0.7, the joint drift ratio, which is determined as the joint drift between roof level and isolator level divided by building height, for the joint located at the flexible end, increases approximately 45% for all site classes. This value is only 5% for the point located near the mass center of the building. In addition, as site class characteristics get worse, joint drift ratio values tend to increase for each building in both directions.
- The buildings with seismic isolator system have a smaller base shear ratio with respect to their fixed-base counterparts. The BSR values of the isolated

buildings to fixed-base building are approximately 0.22, 0.14 and 0.16 for Site Class A, Site Class B and Site Class D respectively.

- No pattern between the variation of the building base shear ratio and the variation of irregularity ratio has been observed. Besides, site class variation does not affect the results of BSR results. This is due to the fact that isolator systems for all buildings have been designed considering the same target period and target displacement even though all have different superstructure masses and stiffnesses.
- Peak floor acceleration-based profiles present that the PFA values tend to increase with increasing irregularity level. As the geometric plan irregularity ratio increase from 0.1 to 0.7, PFA values increase approximately 20%. Especially at the roof level, PFA variation becomes more clear. Increase in PFA results mainly depends on the increase in mass of the buildings, yet irregularity ratio also contributes to the PFA results. In addition, PFA demands tend to increase from Site Class A to Site Class D as expected and observations mentioned above are valid for each site class.
- It is observed that seismic responses of mass concentrated buildings are highly dependent on the location of the mass-concentrated region. If the mass concentration is on the stiff side of the building, seismic demands decrease. On the contrary, all seismic demands tend to increase when the mass concentration is on the flexible side. At roof story, irregularity develops the maximum seismic demands compared to the whole building. Base isolation system minimizes the severe effect of this irregularity, but the adverse effects cannot be completely overcome.
- In this study, the effect of increasing the number of isolator groups on seismic demands of the superstructure has not been observed, and this is attributed to the fact that the isolators with the same characteristics display the same energy dissipation behavior; thus, the group effect is not significant. It is thought that to be able to observe any significant effect, isolator performance and characteristics have to be changed. In addition to this observation, it is presented that if the rigidity eccentricity

of the superstructure and base isolation system are nearly close to each other, the isolator group effect is not significant on the superstructure.

- This research study could be extended to include the evaluation of stress concentration and internal forces especially around the wing intersection zones of the buildings as part of a future endeavor.

REFERENCES

- Aiken, I., Kelly, J. M., Clark, P., Tamura, K., Kikuchi, M., & Itoh, T. (1992). Experimental Studies of Mechanical Characteristics of Three Types of Seismic Isolation Bearings. *Proceedings, Tenth World Conference on Earthquake Engineering, Madrid*.
- ASCE/SEI 7-22. (2021). Minimum Design Loads and Associated Criteria for Buildings and Other Structures. In *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. American Society of Civil Engineers.
<https://doi.org/10.1061/9780784414248>
- Çabuk, E., Akyuz, U., Yakut, A., Murota, N., Shigenobu, S., Mori, T., & Sütçü, F. (2020). *Performance Comparison of High-Damping Rubber Isolators and Friction Pendulum Isolators with Different Modelling Approaches*.
- Cancellara, D., & De Angelis, F. (2017). Assessment and dynamic nonlinear analysis of different base isolation systems for a multi-storey RC building irregular in plan. *Computers and Structures, 180*, 74–88.
<https://doi.org/10.1016/j.compstruc.2016.02.012>
- Cancellara, D., & De Angelis, F. (2019). Dynamic assessment of base isolation systems for irregular in plan structures: Response spectrum analysis vs nonlinear analysis. *Composite Structures, 215*, 98–115. <https://doi.org/10.1016/j.compstruct.2019.02.013>
- Cancellara, D., & De Angelis, F. (2012a). Seismic analysis and comparison of different base isolation systems for a multi-storey RC building with irregularities in plan. *Advanced Materials Research, 594–597*, 1788–1799.
<https://doi.org/10.4028/www.scientific.net/AMR.594-597.1788>
- Cancellara, D., & De Angelis, F. (2012b). Seismical protection properties of high damping rubber bearing and lead rubber bearing base isolation systems for multi-storey RC buildings. *Applied Mechanics and Materials, 234*, 90–95.
<https://doi.org/10.4028/www.scientific.net/AMM.234.90>
- Das, P. K., Dutta, S. C., Asce, M., & Datta, T. K. (2021). *Seismic Behavior of Plan and Vertically Irregular Structures : State of Art and Future Challenges*. 22(2), 1–17.
[https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000440](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000440)

- De Stefano, M., & Pintucchi, B. (2007). A review of research on seismic behaviour of irregular building structures since 2002. *Bulletin of Earthquake Engineering*, 6(2), 285–308. <https://doi.org/10.1007/s10518-007-9052-3>
- Dicleli, M. (2006). Performance of seismic-isolated bridges in relation to near-fault ground-motion and isolator characteristics. *Earthquake Spectra*, 22(4), 887–907. <https://doi.org/10.1193/1.2359715>
- Etedali, S., & Kareshk, M. K. (2022). Mitigation of torsional responses in asymmetric base-isolated structures using an optimal distribution of isolators in base story. *Structures*, 35, 807–817. <https://doi.org/10.1016/j.istruc.2021.11.053>
- Etedali, S., & Sohrabi, M. R. (2015). A proposed approach to mitigate the torsional amplifications of asymmetric base-isolated buildings during earthquakes. *KSCE Journal of Civil Engineering*, 20(2), 768–776. <https://doi.org/10.1007/s12205-015-0325-0>
- Higashino, M., & Okamoto, S. (2006). *Response Control and Seismic Isolation of Buildings* (1st editio). Taylor& Francis. <https://doi.org/doi.org/10.4324/9780203018866>
- Kelly, J. M., & Hodder, S. B. (1982). Experimental Study of Lead and Elastomeric Dampers for Baseisolation Systems in Laminated Neoprene Bearings. *Bull Nz Natl Soc Earthquake Eng*, V 15(N 2), 53–67. <https://doi.org/10.5459/bnzsee.15.2.53-67>
- Kelly, T. E. (2001). *Base Isolation of Structures: Design Guidelines* (Issue July). Holmes Consulting Group Ltd. <http://www.holmesgroup.com/designguide.html>.
- Khoshnoudian, F., & Azad, A. I. (2011). *Effect of two horizontal components of earthquake on nonlinear response of torsionally coupled base isolated structures*. 1018(April 2010), 986–1018. <https://doi.org/10.1002/tal>
- Kikuchi, M., & Aiken, I. D. (1997). An analytical hysteresis model for elastomeric seismic isolation bearings. *Earthquake Engineering and Structural Dynamics*, 26(2), 215–231. [https://doi.org/10.1002/\(SICI\)1096-9845\(199702\)26:2<215::AID-EQE640>3.0.CO;2-9](https://doi.org/10.1002/(SICI)1096-9845(199702)26:2<215::AID-EQE640>3.0.CO;2-9)

- Kilar, V., & Koren, D. (2009). Seismic behaviour of asymmetric base isolated structures with various distributions of isolators. *Engineering Structures*, 31(4), 910–921. <https://doi.org/10.1016/j.engstruct.2008.12.006>
- Kilar, V., Petrovčič, S., Koren, D., & Šilih, S. (2011). Seismic analysis of an asymmetric fixed base and base-isolated high-rack steel structure. *Engineering Structures*, 33(12), 3471–3482. <https://doi.org/10.1016/j.engstruct.2011.07.010>
- Mostagel, N., & Kelly, J. M. (1987). Design Procedure for R-FBI Bearings. In *Report No UCB/EERC-87/18: Vol. Earthquake*.
- Naeim, F., & Kelly M. James. (1999). Design of Seismic Isolated Structures: From Theory to Practice. *Earthquake Spectra*, 16(3), 709–710. <https://doi.org/10.1193/1.1586135>
- Ozsarac, V., Karimzadeh, S., Askan, A., & Erberik, M. A. (2021). Seismic demands of bare and base-isolated steel frames for real against simulated records of a past earthquake. *Structure and Infrastructure Engineering*, 0(0), 1–16. <https://doi.org/10.1080/15732479.2021.1895227>
- Pacific Earthquake Engineering Research Center. Peer ground motion database available from: <http://ngawest2.berkeley.edu>, February 2022.
- Seguin, C. E., Almazán, J. L., & De la Llera, J. C. (2013). Torsional balance of seismically isolated asymmetric structures. *Engineering Structures*, 46, 703–717. <https://doi.org/10.1016/j.engstruct.2012.08.025>
- Seguin, C. E., Llera, J. C. De, & Almaz, L. (2008). *Base – structure interaction of linearly isolated structures with lateral – torsional coupling*. 30, 110–125. <https://doi.org/10.1016/j.engstruct.2007.02.019>
- TBEC. (2018). *Turkish Building Earthquake Code* (Vol. 30364, Issue 1). AFAD.
- Tena-Colunga, A. (2021). Conditions of structural irregularity. Relationships with observed earthquake damage in Mexico City in 2017. *Soil Dynamics and Earthquake Engineering*, 143. <https://doi.org/10.1016/j.soildyn.2021.106630>
- Tena-Colunga, A., & Escamilla-Cruz, J. L. (2007). Torsional amplifications in asymmetric base-isolated structures. *Engineering Structures*, 29(2), 237–247. <https://doi.org/10.1016/j.engstruct.2006.03.036>

- Tena-Colunga, A., & Zambrana-Rojas, C. (2006). Dynamic torsional amplifications of base-isolated structures with an eccentric isolation system. *Engineering Structures*, 28(1), 72–83. <https://doi.org/10.1016/j.engstruct.2005.07.003>
- Zayas, V. ., Low, S. ., & Mahin, S. . (1990). A Simple Pendulum Technique for Achieving Seismic Isolation. *Earthquake Spectra*, 6(2), 317–333. <https://doi.org/10.1193/1.1585573>

APPENDICES

A. Tables for Results

Table A.1 IDR results (Bldg: Symmetric – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001739	0.001917	0.002071	0.001926	0.001850	0.001504	0.001215	0.000885	0.002071
1_H2	0.001320	0.001771	0.001797	0.001878	0.001848	0.001686	0.001350	0.000885	0.001878
2_H1	0.001051	0.001303	0.001331	0.001206	0.001105	0.001024	0.000872	0.000603	0.001331
2_H2	0.001682	0.001792	0.001632	0.001692	0.001682	0.001422	0.001037	0.000756	0.001792
3_H1	0.001301	0.001955	0.002104	0.002084	0.001934	0.001646	0.001224	0.000763	0.002104
3_H2	0.001687	0.001874	0.001873	0.001864	0.001825	0.001563	0.001121	0.000728	0.001874
4_H1	0.001380	0.001659	0.001811	0.001707	0.001530	0.001307	0.000995	0.000636	0.001811
4_H2	0.001292	0.001584	0.001800	0.001651	0.001525	0.001285	0.000957	0.000649	0.001800
5_H1	0.001663	0.001599	0.001611	0.001605	0.001618	0.001295	0.000886	0.000524	0.001663
5_H2	0.000670	0.000952	0.000944	0.000850	0.000741	0.000597	0.000433	0.000287	0.000952
6_H1	0.001294	0.001717	0.001837	0.001768	0.001655	0.001439	0.001195	0.000821	0.001837
6_H2	0.001900	0.002118	0.002503	0.002591	0.002542	0.002371	0.001963	0.001300	0.002591
7_H1	0.001463	0.001643	0.001694	0.001944	0.001991	0.001671	0.001421	0.000991	0.001991
7_H2	0.001527	0.002077	0.002424	0.002470	0.002344	0.002117	0.001713	0.001118	0.002470
8_H1	0.001667	0.002064	0.002591	0.002923	0.002860	0.002513	0.002119	0.001376	0.002923
8_H2	0.002051	0.002498	0.002869	0.003042	0.003032	0.002781	0.002225	0.001416	0.003042
9_H1	0.001507	0.002066	0.002185	0.002195	0.002066	0.001739	0.001254	0.000759	0.002195
9_H2	0.001056	0.001537	0.001592	0.001512	0.001361	0.001127	0.000817	0.000508	0.001592
10_H1	0.001834	0.001706	0.001788	0.001621	0.001705	0.001345	0.000896	0.000641	0.001834
10_H2	0.001224	0.001429	0.001380	0.001321	0.001213	0.000985	0.000684	0.000472	0.001429
11_H1	0.001727	0.001834	0.001824	0.001838	0.001831	0.001528	0.001027	0.000757	0.001838
11_H2	0.001300	0.001627	0.001632	0.001614	0.001530	0.001272	0.000882	0.000519	0.001632

Min	0.000670	0.000952	0.000944	0.000850	0.000741	0.000597	0.000433	0.000287	0.000952
Max	0.002051	0.002498	0.002869	0.003042	0.003032	0.002781	0.002225	0.001416	0.003042
Mean	0.001470	0.001760	0.001877	0.001877	0.001809	0.001555	0.001195	0.000791	0.001939
σ	0.000321	0.000321	0.000443	0.000523	0.000537	0.000514	0.000457	0.000297	0.000488
Mean-σ	0.001149	0.001439	0.001434	0.001354	0.001271	0.001042	0.000738	0.000494	0.001451
Mean+σ	0.001791	0.002081	0.002320	0.002401	0.002346	0.002069	0.001652	0.001087	0.002426
Q1	0.001296	0.001606	0.001632	0.001616	0.001530	0.001288	0.000889	0.000611	0.001695
Median	0.001485	0.001744	0.001806	0.001803	0.001765	0.001472	0.001079	0.000757	0.001838
Q3	0.001686	0.001946	0.002096	0.002049	0.001977	0.001682	0.001326	0.000885	0.002096

Table A.2 IDR results (Bldg: Symmetric – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001320	0.001771	0.001797	0.001878	0.001848	0.001686	0.001350	0.000885	0.001878
1_H2	0.001739	0.001917	0.002071	0.001926	0.001850	0.001504	0.001215	0.000885	0.002071
2_H1	0.001682	0.001792	0.001632	0.001692	0.001682	0.001422	0.001037	0.000756	0.001792
2_H2	0.001051	0.001303	0.001331	0.001206	0.001105	0.001024	0.000872	0.000603	0.001331
3_H1	0.001687	0.001874	0.001873	0.001864	0.001825	0.001563	0.001121	0.000728	0.001874
3_H2	0.001301	0.001955	0.002104	0.002084	0.001934	0.001646	0.001224	0.000763	0.002104
4_H1	0.001292	0.001584	0.001800	0.001651	0.001525	0.001285	0.000957	0.000649	0.001800
4_H2	0.001380	0.001659	0.001811	0.001707	0.001530	0.001307	0.000995	0.000636	0.001811
5_H1	0.000670	0.000952	0.000944	0.000850	0.000741	0.000597	0.000433	0.000287	0.000952
5_H2	0.001663	0.001599	0.001611	0.001605	0.001618	0.001295	0.000886	0.000524	0.001663
6_H1	0.001900	0.002118	0.002503	0.002591	0.002542	0.002371	0.001963	0.001300	0.002591
6_H2	0.001294	0.001717	0.001837	0.001768	0.001655	0.001439	0.001195	0.000821	0.001837
7_H1	0.001527	0.002077	0.002424	0.002470	0.002344	0.002117	0.001713	0.001118	0.002470
7_H2	0.001463	0.001643	0.001694	0.001944	0.001991	0.001671	0.001421	0.000991	0.001991
8_H1	0.002051	0.002498	0.002869	0.003042	0.003032	0.002781	0.002225	0.001416	0.003042
8_H2	0.001667	0.002064	0.002591	0.002923	0.002860	0.002513	0.002119	0.001376	0.002923
9_H1	0.001056	0.001537	0.001592	0.001512	0.001361	0.001127	0.000817	0.000508	0.001592
9_H2	0.001507	0.002066	0.002185	0.002195	0.002066	0.001739	0.001254	0.000759	0.002195
10_H1	0.001224	0.001429	0.001380	0.001321	0.001213	0.000985	0.000684	0.000472	0.001429
10_H2	0.001834	0.001706	0.001788	0.001621	0.001705	0.001345	0.000896	0.000641	0.001834
11_H1	0.001300	0.001627	0.001632	0.001614	0.001530	0.001272	0.000882	0.000519	0.001632
11_H2	0.001727	0.001834	0.001824	0.001838	0.001831	0.001528	0.001027	0.000757	0.001838

Min	0.000670	0.000952	0.000944	0.000850	0.000741	0.000597	0.000433	0.000287	0.000952
Max	0.002051	0.002498	0.002869	0.003042	0.003032	0.002781	0.002225	0.001416	0.003042
Mean	0.001470	0.001760	0.001877	0.001877	0.001809	0.001555	0.001195	0.000791	0.001939
σ	0.000321	0.000321	0.000443	0.000523	0.000537	0.000514	0.000457	0.000297	0.000488
Mean- σ	0.001149	0.001439	0.001434	0.001354	0.001271	0.001042	0.000738	0.000494	0.001451
Mean+ σ	0.001791	0.002081	0.002320	0.002401	0.002346	0.002069	0.001652	0.001087	0.002426
Q1	0.001296	0.001606	0.001632	0.001616	0.001530	0.001288	0.000889	0.000611	0.001695
Median	0.001485	0.001744	0.001806	0.001803	0.001765	0.001472	0.001079	0.000757	0.001838
Q3	0.001686	0.001946	0.002096	0.002049	0.001977	0.001682	0.001326	0.000885	0.002096

Table A.3 IDR results (Bldg: Symmetric – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001648	0.002035	0.002375	0.002170	0.001871	0.001600	0.001334	0.000926	0.002375
1_H2	0.002193	0.002135	0.002352	0.002194	0.002109	0.001721	0.001404	0.001033	0.002352
2_H1	0.001954	0.002405	0.002417	0.002415	0.002546	0.002187	0.001520	0.001073	0.002546
2_H2	0.003339	0.002795	0.002601	0.002816	0.003089	0.002396	0.001581	0.001042	0.003339
3_H1	0.001470	0.002002	0.002349	0.002568	0.002567	0.002348	0.001869	0.001190	0.002568
3_H2	0.002230	0.002762	0.002982	0.003048	0.002841	0.002452	0.001844	0.001167	0.003048
4_H1	0.002044	0.002097	0.002252	0.002176	0.001944	0.001568	0.001114	0.000707	0.002252
4_H2	0.002505	0.002054	0.002062	0.002103	0.002363	0.001859	0.001269	0.001000	0.002505
5_H1	0.002310	0.002301	0.002145	0.002339	0.002385	0.001932	0.001192	0.000815	0.002385
5_H2	0.001767	0.001984	0.001905	0.001963	0.001935	0.001597	0.001081	0.000745	0.001984
6_H1	0.001802	0.002109	0.002072	0.002203	0.002208	0.001848	0.001239	0.000767	0.002208
6_H2	0.001994	0.002485	0.002490	0.002484	0.002403	0.002027	0.001370	0.000870	0.002490
7_H1	0.001518	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
7_H2	0.001831	0.001900	0.001914	0.001806	0.001771	0.001419	0.001025	0.000684	0.001914
8_H1	0.002157	0.001972	0.002021	0.001918	0.001845	0.001575	0.001316	0.000902	0.002157
8_H2	0.001952	0.002542	0.002682	0.002808	0.002744	0.002335	0.001662	0.000985	0.002808
9_H1	0.002430	0.003189	0.003326	0.003395	0.003149	0.002495	0.001661	0.001122	0.003395
9_H2	0.002392	0.002983	0.003007	0.003137	0.003097	0.002564	0.001970	0.001330	0.003137
10_H1	0.002779	0.002999	0.003009	0.003329	0.003418	0.002866	0.002139	0.001494	0.003418
10_H2	0.002885	0.003098	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
11_H1	0.002273	0.002306	0.002316	0.002525	0.002613	0.002102	0.001744	0.001277	0.002613
11_H2	0.002607	0.002220	0.002008	0.002203	0.002264	0.001864	0.001419	0.000907	0.002607

Min	0.001470	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
Max	0.003339	0.003189	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
Mean	0.002185	0.002368	0.002430	0.002495	0.002465	0.002056	0.001513	0.001017	0.002614
σ	0.000460	0.000430	0.000453	0.000529	0.000556	0.000495	0.000396	0.000261	0.000505
Mean- σ	0.001726	0.001938	0.001977	0.001966	0.001909	0.001561	0.001117	0.000756	0.002108
Mean+ σ	0.002645	0.002798	0.002883	0.003024	0.003021	0.002552	0.001910	0.001279	0.003119
Q1	0.001861	0.002040	0.002065	0.002172	0.001985	0.001630	0.001247	0.000829	0.002277
Median	0.002175	0.002261	0.002351	0.002377	0.002394	0.001980	0.001412	0.000993	0.002526
Q3	0.002421	0.002707	0.002662	0.002814	0.002817	0.002384	0.001724	0.001156	0.002988

Table A.4 IDR results (Bldg: Symmetric – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002193	0.002135	0.002352	0.002194	0.002109	0.001721	0.001404	0.001033	0.002352
1_H2	0.001648	0.002035	0.002375	0.002170	0.001871	0.001600	0.001334	0.000926	0.002375
2_H1	0.003339	0.002795	0.002601	0.002816	0.003089	0.002396	0.001581	0.001042	0.003339
2_H2	0.001954	0.002405	0.002417	0.002415	0.002546	0.002187	0.001520	0.001073	0.002546
3_H1	0.002230	0.002762	0.002982	0.003048	0.002841	0.002452	0.001844	0.001167	0.003048
3_H2	0.001470	0.002002	0.002349	0.002568	0.002567	0.002348	0.001869	0.001190	0.002568
4_H1	0.002505	0.002054	0.002062	0.002103	0.002363	0.001859	0.001269	0.001000	0.002505
4_H2	0.002044	0.002097	0.002252	0.002176	0.001944	0.001568	0.001114	0.000707	0.002252
5_H1	0.001767	0.001984	0.001905	0.001963	0.001935	0.001597	0.001081	0.000745	0.001984
5_H2	0.002310	0.002301	0.002145	0.002339	0.002385	0.001932	0.001192	0.000815	0.002385
6_H1	0.001994	0.002485	0.002490	0.002484	0.002403	0.002027	0.001370	0.000870	0.002490
6_H2	0.001802	0.002109	0.002072	0.002203	0.002208	0.001848	0.001239	0.000767	0.002208
7_H1	0.001831	0.001900	0.001914	0.001806	0.001771	0.001419	0.001025	0.000684	0.001914
7_H2	0.001518	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
8_H1	0.001952	0.002542	0.002682	0.002808	0.002744	0.002335	0.001662	0.000985	0.002808
8_H2	0.002157	0.001972	0.002021	0.001918	0.001845	0.001575	0.001316	0.000902	0.002157
9_H1	0.002392	0.002983	0.003007	0.003137	0.003097	0.002564	0.001970	0.001330	0.003137
9_H2	0.002430	0.003189	0.003326	0.003395	0.003149	0.002495	0.001661	0.001122	0.003395
10_H1	0.002885	0.003098	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
10_H2	0.002779	0.002999	0.003009	0.003329	0.003418	0.002866	0.002139	0.001494	0.003418
11_H1	0.002607	0.002220	0.002008	0.002203	0.002264	0.001864	0.001419	0.000907	0.002607
11_H2	0.002273	0.002306	0.002316	0.002525	0.002613	0.002102	0.001744	0.001277	0.002613

Min	0.001470	0.001720	0.001845	0.001734	0.001530	0.001249	0.000967	0.000677	0.001845
Max	0.003339	0.003189	0.003329	0.003555	0.003546	0.003238	0.002575	0.001664	0.003555
Mean	0.002185	0.002368	0.002430	0.002495	0.002465	0.002056	0.001513	0.001017	0.002614
σ	0.000460	0.000430	0.000453	0.000529	0.000556	0.000495	0.000396	0.000261	0.000505
Mean- σ	0.001726	0.001938	0.001977	0.001966	0.001909	0.001561	0.001117	0.000756	0.002108
Mean+ σ	0.002645	0.002798	0.002883	0.003024	0.003021	0.002552	0.001910	0.001279	0.003119
Q1	0.001861	0.002040	0.002065	0.002172	0.001985	0.001630	0.001247	0.000829	0.002277
Median	0.002175	0.002261	0.002351	0.002377	0.002394	0.001980	0.001412	0.000993	0.002526
Q3	0.002421	0.002707	0.002662	0.002814	0.002817	0.002384	0.001724	0.001156	0.002988

Table A.5 IDR results (Bldg: Symmetric – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002232	0.002840	0.003197	0.003357	0.003264	0.002869	0.002191	0.001369	0.003357
1_H2	0.003422	0.002723	0.002676	0.002971	0.003018	0.002467	0.001585	0.000952	0.003422
2_H1	0.003685	0.002991	0.002319	0.002828	0.003163	0.002440	0.001467	0.001156	0.003685
2_H2	0.001955	0.002076	0.002312	0.002223	0.002017	0.001715	0.001331	0.000874	0.002312
3_H1	0.003814	0.002630	0.002074	0.002348	0.002862	0.002180	0.001276	0.001165	0.003814
3_H2	0.002027	0.001806	0.001770	0.001702	0.001802	0.001402	0.000909	0.000704	0.002027
4_H1	0.002598	0.002924	0.003485	0.003626	0.003495	0.003117	0.002457	0.001645	0.003626
4_H2	0.002481	0.003558	0.003901	0.003959	0.003654	0.002974	0.002383	0.001572	0.003959
5_H1	0.002922	0.002198	0.002592	0.002635	0.002481	0.002206	0.001763	0.001158	0.002922
5_H2	0.002786	0.002366	0.002191	0.002312	0.002458	0.002082	0.001572	0.000983	0.002786
6_H1	0.002128	0.001993	0.001766	0.001906	0.001993	0.001577	0.001092	0.000685	0.002128
6_H2	0.003466	0.002471	0.001723	0.002167	0.002560	0.001915	0.000933	0.000869	0.003466
7_H1	0.002151	0.002143	0.001941	0.001992	0.002018	0.001567	0.001136	0.000778	0.002151
7_H2	0.003403	0.002471	0.001907	0.002277	0.002607	0.001958	0.001207	0.000943	0.003403
8_H1	0.002313	0.002168	0.002345	0.002253	0.002288	0.001865	0.001521	0.001051	0.002345
8_H2	0.002439	0.002115	0.001856	0.002019	0.002204	0.001737	0.001060	0.000719	0.002439
9_H1	0.002704	0.002830	0.002804	0.003030	0.003092	0.002738	0.002063	0.001273	0.003092
9_H2	0.003141	0.003263	0.003678	0.003801	0.003706	0.003324	0.002574	0.001615	0.003801
10_H1	0.002017	0.002164	0.002357	0.002460	0.002401	0.002149	0.001613	0.001003	0.002460
10_H2	0.002462	0.003437	0.004239	0.004656	0.004918	0.004297	0.003060	0.001781	0.004918
11_H1	0.004088	0.002924	0.003299	0.003569	0.003462	0.002971	0.002187	0.001329	0.004088
11_H2	0.002013	0.002356	0.002344	0.002468	0.002450	0.002157	0.001718	0.001098	0.002468

Min	0.001955	0.001806	0.001723	0.001702	0.001802	0.001402	0.000909	0.000685	0.002027
Max	0.004088	0.003558	0.004239	0.004656	0.004918	0.004297	0.003060	0.001781	0.004918
Mean	0.002739	0.002566	0.002581	0.002753	0.002814	0.002350	0.001686	0.001124	0.003121
σ	0.000658	0.000484	0.000744	0.000777	0.000741	0.000697	0.000588	0.000320	0.000774
Mean-σ	0.002081	0.002081	0.001837	0.001976	0.002074	0.001653	0.001098	0.000803	0.002347
Mean+σ	0.003396	0.003050	0.003325	0.003530	0.003555	0.003048	0.002274	0.001444	0.003896
Q1	0.002171	0.002165	0.001974	0.002231	0.002316	0.001878	0.001224	0.000891	0.002444
Median	0.002540	0.002471	0.002345	0.002464	0.002584	0.002169	0.001579	0.001075	0.003225
Q3	0.003338	0.002903	0.003099	0.003275	0.003239	0.002836	0.002156	0.001315	0.003670

Table A.6 IDR results (Bldg: Symmetric – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.003422	0.002723	0.002676	0.002971	0.003018	0.002467	0.001585	0.000952	0.003422
1_H2	0.002232	0.002840	0.003197	0.003357	0.003264	0.002869	0.002191	0.001369	0.003357
2_H1	0.001955	0.002076	0.002312	0.002223	0.002017	0.001715	0.001331	0.000874	0.002312
2_H2	0.003685	0.002991	0.002319	0.002828	0.003163	0.002440	0.001467	0.001156	0.003685
3_H1	0.002027	0.001806	0.001770	0.001702	0.001802	0.001402	0.000909	0.000704	0.002027
3_H2	0.003814	0.002630	0.002074	0.002348	0.002862	0.002180	0.001276	0.001165	0.003814
4_H1	0.002481	0.003558	0.003901	0.003959	0.003654	0.002974	0.002383	0.001572	0.003959
4_H2	0.002598	0.002924	0.003485	0.003626	0.003495	0.003117	0.002457	0.001645	0.003626
5_H1	0.002786	0.002366	0.002191	0.002312	0.002458	0.002082	0.001572	0.000983	0.002786
5_H2	0.002922	0.002198	0.002592	0.002635	0.002481	0.002206	0.001763	0.001158	0.002922
6_H1	0.003466	0.002471	0.001723	0.002167	0.002560	0.001915	0.000933	0.000869	0.003466
6_H2	0.002128	0.001993	0.001766	0.001906	0.001993	0.001577	0.001092	0.000685	0.002128
7_H1	0.003403	0.002471	0.001907	0.002277	0.002607	0.001958	0.001207	0.000943	0.003403
7_H2	0.002151	0.002143	0.001941	0.001992	0.002018	0.001567	0.001136	0.000778	0.002151
8_H1	0.002439	0.002115	0.001856	0.002019	0.002204	0.001737	0.001060	0.000719	0.002439
8_H2	0.002313	0.002168	0.002345	0.002253	0.002288	0.001865	0.001521	0.001051	0.002345
9_H1	0.003141	0.003263	0.003678	0.003801	0.003706	0.003324	0.002574	0.001615	0.003801
9_H2	0.002704	0.002830	0.002804	0.003030	0.003092	0.002738	0.002063	0.001273	0.003092
10_H1	0.002462	0.003437	0.004239	0.004656	0.004918	0.004297	0.003060	0.001781	0.004918
10_H2	0.002017	0.002164	0.002357	0.002460	0.002401	0.002149	0.001613	0.001003	0.002460
11_H1	0.002013	0.002356	0.002344	0.002468	0.002450	0.002157	0.001718	0.001098	0.002468
11_H2	0.004088	0.002924	0.003299	0.003569	0.003462	0.002971	0.002187	0.001329	0.004088

Min	0.001955	0.001806	0.001723	0.001702	0.001802	0.001402	0.000909	0.000685	0.002027
Max	0.004088	0.003558	0.004239	0.004656	0.004918	0.004297	0.003060	0.001781	0.004918
Mean	0.002739	0.002566	0.002581	0.002753	0.002814	0.002350	0.001686	0.001124	0.003121
σ	0.000658	0.000484	0.000744	0.000777	0.000741	0.000697	0.000588	0.000320	0.000774
Mean- σ	0.002081	0.002081	0.001837	0.001976	0.002074	0.001653	0.001098	0.000803	0.002347
Mean+ σ	0.003396	0.003050	0.003325	0.003530	0.003555	0.003048	0.002274	0.001444	0.003896
Q1	0.002171	0.002165	0.001974	0.002231	0.002316	0.001878	0.001224	0.000891	0.002444
Median	0.002540	0.002471	0.002345	0.002464	0.002584	0.002169	0.001579	0.001075	0.003225
Q3	0.003338	0.002903	0.003099	0.003275	0.003239	0.002836	0.002156	0.001315	0.003670

Table A.7 IDR results (Bldg: T1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001342	0.001740	0.001843	0.001788	0.001656	0.001546	0.001146	0.000662	0.001843
1_H2	0.001125	0.001585	0.001824	0.001977	0.002016	0.001866	0.001451	0.000917	0.002016
2_H1	0.000843	0.001217	0.001149	0.001036	0.000982	0.000916	0.000694	0.000436	0.001217
2_H2	0.001350	0.001563	0.001627	0.001646	0.001433	0.001318	0.000983	0.000670	0.001646
3_H1	0.001205	0.001809	0.001950	0.001920	0.001748	0.001463	0.001109	0.000727	0.001950
3_H2	0.001382	0.001725	0.001812	0.001788	0.001625	0.001369	0.001063	0.000717	0.001812
4_H1	0.001125	0.001434	0.001506	0.001452	0.001342	0.001156	0.000884	0.000577	0.001506
4_H2	0.001092	0.001414	0.001490	0.001486	0.001333	0.001099	0.000853	0.000590	0.001490
5_H1	0.001378	0.001492	0.001571	0.001649	0.001391	0.001132	0.000856	0.000606	0.001649
5_H2	0.000618	0.000871	0.000836	0.000769	0.000653	0.000544	0.000396	0.000268	0.000871
6_H1	0.001056	0.001624	0.001738	0.001727	0.001662	0.001525	0.001181	0.000729	0.001738
6_H2	0.001618	0.001917	0.002061	0.002162	0.002141	0.002011	0.001594	0.001009	0.002162
7_H1	0.001230	0.001516	0.001748	0.001911	0.001718	0.001674	0.001294	0.000765	0.001911
7_H2	0.001334	0.002025	0.002309	0.002338	0.002288	0.002068	0.001582	0.000981	0.002338
8_H1	0.001376	0.002029	0.002525	0.002717	0.002521	0.002530	0.002034	0.001243	0.002717
8_H2	0.001738	0.002251	0.002557	0.002682	0.002673	0.002472	0.001976	0.001268	0.002682
9_H1	0.001256	0.001703	0.001822	0.001832	0.001649	0.001354	0.001044	0.000714	0.001832
9_H2	0.000937	0.001370	0.001403	0.001321	0.001161	0.000942	0.000685	0.000449	0.001403
10_H1	0.001455	0.001510	0.001588	0.001687	0.001394	0.001121	0.000870	0.000626	0.001687
10_H2	0.001008	0.001257	0.001249	0.001195	0.001025	0.000826	0.000595	0.000424	0.001257
11_H1	0.001355	0.001593	0.001694	0.001738	0.001532	0.001243	0.000974	0.000694	0.001738
11_H2	0.001097	0.001445	0.001501	0.001507	0.001331	0.001091	0.000841	0.000590	0.001507

Min	0.000618	0.000871	0.000836	0.000769	0.000653	0.000544	0.000396	0.000268	0.000871
Max	0.001738	0.002251	0.002557	0.002717	0.002673	0.002530	0.002034	0.001268	0.002717
Mean	0.001224	0.001595	0.001718	0.001742	0.001603	0.001421	0.001096	0.000712	0.001771
σ	0.000251	0.000304	0.000410	0.000470	0.000494	0.000512	0.000419	0.000248	0.000442
Mean- σ	0.000972	0.001291	0.001308	0.001272	0.001110	0.000909	0.000676	0.000464	0.001330
Mean+ σ	0.001475	0.001899	0.002129	0.002212	0.002097	0.001933	0.001515	0.000960	0.002213
Q1	0.001093	0.001437	0.001502	0.001491	0.001335	0.001105	0.000854	0.000590	0.001506
Median	0.001243	0.001574	0.001716	0.001733	0.001579	0.001336	0.001014	0.000682	0.001738
Q3	0.001371	0.001736	0.001838	0.001918	0.001741	0.001642	0.001266	0.000756	0.001940

Table A.8 IDR results (Bldg: T1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001418	0.001990	0.002118	0.002085	0.001851	0.001616	0.001314	0.000902	0.002118
1_H2	0.001736	0.002163	0.002317	0.002368	0.002100	0.001717	0.001363	0.001007	0.002368
2_H1	0.001634	0.001982	0.002063	0.002078	0.001805	0.001497	0.001241	0.000935	0.002078
2_H2	0.001038	0.001554	0.001562	0.001460	0.001393	0.001305	0.001074	0.000747	0.001562
3_H1	0.001641	0.002091	0.002201	0.002200	0.001995	0.001713	0.001387	0.001015	0.002201
3_H2	0.001433	0.002135	0.002324	0.002330	0.002193	0.001919	0.001521	0.001067	0.002330
4_H1	0.001328	0.001798	0.001913	0.001844	0.001720	0.001545	0.001194	0.000860	0.001913
4_H2	0.001285	0.001971	0.002123	0.002088	0.001961	0.001729	0.001374	0.000954	0.002123
5_H1	0.000721	0.001039	0.001068	0.001018	0.000927	0.000793	0.000605	0.000426	0.001068
5_H2	0.001422	0.001717	0.001805	0.001798	0.001632	0.001384	0.001115	0.000818	0.001805
6_H1	0.001658	0.002538	0.002850	0.002903	0.002866	0.002694	0.002218	0.001526	0.002903
6_H2	0.001418	0.001856	0.001990	0.002003	0.001932	0.001724	0.001355	0.000929	0.002003
7_H1	0.001633	0.002244	0.002454	0.002522	0.002493	0.002344	0.001875	0.001266	0.002522
7_H2	0.001366	0.001838	0.001997	0.002262	0.002092	0.001937	0.001557	0.001049	0.002262
8_H1	0.002042	0.003095	0.003515	0.003647	0.003567	0.003259	0.002646	0.001823	0.003647
8_H2	0.001734	0.002268	0.002722	0.003166	0.003174	0.002834	0.002277	0.001589	0.003174
9_H1	0.001142	0.001730	0.001837	0.001769	0.001620	0.001388	0.001079	0.000766	0.001837
9_H2	0.001668	0.002371	0.002600	0.002622	0.002402	0.002030	0.001587	0.001117	0.002622
10_H1	0.001250	0.001609	0.001632	0.001576	0.001386	0.001155	0.000902	0.000664	0.001632
10_H2	0.001572	0.001802	0.001896	0.001949	0.001688	0.001563	0.001157	0.000858	0.001949
11_H1	0.001379	0.001864	0.001977	0.001991	0.001818	0.001539	0.001225	0.000899	0.001991
11_H2	0.001691	0.002057	0.002191	0.002271	0.002026	0.001678	0.001361	0.001019	0.002271

Min	0.000721	0.001039	0.001068	0.001018	0.000927	0.000793	0.000605	0.000426	0.001068
Max	0.002042	0.003095	0.003515	0.003647	0.003567	0.003259	0.002646	0.001823	0.003647
Mean	0.001464	0.001987	0.002143	0.002180	0.002029	0.001789	0.001429	0.001011	0.002199
σ	0.000282	0.000401	0.000500	0.000571	0.000597	0.000567	0.000469	0.000313	0.000553
Mean- σ	0.001182	0.001585	0.001644	0.001609	0.001432	0.001222	0.000960	0.000698	0.001646
Mean+ σ	0.001746	0.002388	0.002643	0.002750	0.002626	0.002356	0.001897	0.001324	0.002752
Q1	0.001338	0.001799	0.001900	0.001870	0.001696	0.001508	0.001166	0.000859	0.001922
Median	0.001428	0.001977	0.002091	0.002087	0.001947	0.001696	0.001358	0.000945	0.002121
Q3	0.001654	0.002156	0.002322	0.002359	0.002170	0.001933	0.001548	0.001063	0.002359

Table A.9 IDR results (Bldg: T1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001349	0.001991	0.002175	0.002081	0.001994	0.001783	0.001292	0.000782	0.002175
1_H2	0.001746	0.001865	0.002028	0.002145	0.001872	0.001777	0.001301	0.000851	0.002145
2_H1	0.001638	0.002121	0.002271	0.002259	0.002150	0.001792	0.001420	0.000997	0.002271
2_H2	0.002636	0.002583	0.002824	0.003102	0.002483	0.001981	0.001586	0.001145	0.003102
3_H1	0.001290	0.001939	0.002192	0.002345	0.002357	0.002145	0.001656	0.001024	0.002357
3_H2	0.001860	0.002539	0.002838	0.002956	0.002689	0.002212	0.001761	0.001174	0.002956
4_H1	0.001581	0.001802	0.001883	0.001931	0.001609	0.001238	0.000947	0.000679	0.001931
4_H2	0.001940	0.001855	0.002047	0.002292	0.001850	0.001450	0.001114	0.000861	0.002292
5_H1	0.001789	0.002098	0.002281	0.002402	0.002054	0.001549	0.001178	0.000853	0.002402
5_H2	0.001481	0.001847	0.001987	0.002048	0.001801	0.001445	0.001132	0.000800	0.002048
6_H1	0.001440	0.001803	0.001944	0.001993	0.001776	0.001427	0.001122	0.000802	0.001993
6_H2	0.001596	0.002225	0.002444	0.002429	0.002190	0.001838	0.001394	0.000923	0.002444
7_H1	0.001210	0.001468	0.001510	0.001406	0.001244	0.001146	0.000827	0.000531	0.001510
7_H2	0.001451	0.001719	0.001835	0.001886	0.001611	0.001243	0.000955	0.000679	0.001886
8_H1	0.001728	0.001778	0.001814	0.001825	0.001564	0.001399	0.001059	0.000724	0.001825
8_H2	0.001600	0.002199	0.002474	0.002581	0.002390	0.002008	0.001552	0.001041	0.002581
9_H1	0.002138	0.002989	0.003372	0.003452	0.003023	0.002359	0.001768	0.001198	0.003452
9_H2	0.001951	0.002567	0.002820	0.002929	0.002580	0.002107	0.001675	0.001091	0.002929
10_H1	0.002153	0.002604	0.002942	0.003188	0.002913	0.002420	0.001909	0.001336	0.003188
10_H2	0.002260	0.002614	0.002908	0.003132	0.003029	0.002796	0.002233	0.001423	0.003132
11_H1	0.001855	0.002055	0.002261	0.002537	0.002241	0.001792	0.001376	0.001039	0.002537
11_H2	0.001902	0.001919	0.002063	0.002176	0.001871	0.001669	0.001321	0.000855	0.002176

Min	0.001210	0.001468	0.001510	0.001406	0.001244	0.001146	0.000827	0.000531	0.001510
Max	0.002636	0.002989	0.003372	0.003452	0.003029	0.002796	0.002233	0.001423	0.003452
Mean	0.001754	0.002117	0.002314	0.002413	0.002150	0.001799	0.001390	0.000946	0.002424
σ	0.000344	0.000381	0.000463	0.000523	0.000493	0.000427	0.000350	0.000223	0.000511
Mean- σ	0.001410	0.001736	0.001851	0.001891	0.001657	0.001372	0.001040	0.000722	0.001913
Mean+ σ	0.002099	0.002498	0.002778	0.002936	0.002642	0.002226	0.001740	0.001169	0.002935
Q1	0.001506	0.001849	0.001997	0.002056	0.001813	0.001446	0.001125	0.000801	0.002072
Median	0.001737	0.002023	0.002227	0.002319	0.002102	0.001788	0.001349	0.000892	0.002325
Q3	0.001931	0.002461	0.002734	0.002842	0.002460	0.002082	0.001639	0.001079	0.002842

Table A.10 IDR results (Bldg: T1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001919	0.002232	0.002411	0.002550	0.002337	0.002021	0.001697	0.001275	0.002550
1_H2	0.001667	0.002204	0.002361	0.002378	0.002096	0.001900	0.001503	0.001026	0.002378
2_H1	0.002742	0.002944	0.003096	0.003387	0.002799	0.002235	0.001792	0.001412	0.003387
2_H2	0.002009	0.002844	0.003135	0.003150	0.002810	0.002389	0.001993	0.001462	0.003150
3_H1	0.002273	0.003243	0.003729	0.003865	0.003545	0.002982	0.002332	0.001642	0.003865
3_H2	0.001528	0.002237	0.002580	0.002715	0.002723	0.002527	0.002002	0.001351	0.002723
4_H1	0.002055	0.002201	0.002362	0.002619	0.002191	0.002012	0.001529	0.001122	0.002619
4_H2	0.001983	0.002531	0.002837	0.002861	0.002668	0.002280	0.001747	0.001202	0.002861
5_H1	0.001627	0.001966	0.002075	0.002122	0.001829	0.001514	0.001203	0.000924	0.002122
5_H2	0.002183	0.002408	0.002560	0.002742	0.002322	0.001865	0.001440	0.001151	0.002742
6_H1	0.001988	0.002670	0.002890	0.002951	0.002674	0.002261	0.001872	0.001403	0.002951
6_H2	0.001746	0.002292	0.002517	0.002625	0.002426	0.002055	0.001676	0.001218	0.002625
7_H1	0.001705	0.001929	0.002120	0.002168	0.002022	0.001747	0.001406	0.001014	0.002168
7_H2	0.001434	0.001977	0.002117	0.002077	0.001920	0.001653	0.001281	0.000896	0.002117
8_H1	0.002077	0.002878	0.003212	0.003342	0.003091	0.002632	0.002092	0.001491	0.003342
8_H2	0.001904	0.002131	0.002237	0.002132	0.002039	0.001884	0.001516	0.001127	0.002237
9_H1	0.002608	0.003391	0.003886	0.004186	0.003955	0.003552	0.002873	0.001941	0.004186
9_H2	0.002396	0.003281	0.003619	0.003688	0.003275	0.002730	0.002228	0.001647	0.003688
10_H1	0.002858	0.003783	0.004396	0.004655	0.004549	0.004122	0.003330	0.002299	0.004655
10_H2	0.002742	0.003323	0.003665	0.003930	0.003530	0.003255	0.002822	0.001993	0.003930
11_H1	0.002371	0.002467	0.002629	0.002761	0.002395	0.002021	0.001640	0.001197	0.002761
11_H2	0.002194	0.002607	0.002847	0.003101	0.002751	0.002633	0.002139	0.001404	0.003101

Min	0.001434	0.001929	0.002075	0.002077	0.001829	0.001514	0.001203	0.000896	0.002117
Max	0.002858	0.003783	0.004396	0.004655	0.004549	0.004122	0.003330	0.002299	0.004655
Mean	0.002091	0.002615	0.002876	0.003000	0.002725	0.002376	0.001914	0.001373	0.003007
σ	0.000404	0.000529	0.000647	0.000714	0.000698	0.000646	0.000544	0.000357	0.000706
Mean- σ	0.001687	0.002086	0.002230	0.002286	0.002027	0.001730	0.001371	0.001015	0.002302
Mean+ σ	0.002496	0.003144	0.003523	0.003714	0.003423	0.003022	0.002458	0.001730	0.003713
Q1	0.001786	0.002211	0.002374	0.002567	0.002224	0.001928	0.001519	0.001133	0.002567
Median	0.002032	0.002499	0.002733	0.002811	0.002671	0.002248	0.001770	0.001313	0.002811
Q3	0.002347	0.002928	0.003193	0.003376	0.003021	0.002633	0.002127	0.001484	0.003376

Table A.11 IDR results (Bldg: T1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001662	0.002564	0.002942	0.003093	0.002968	0.002605	0.002028	0.001317	0.003093
1_H2	0.002537	0.002403	0.002719	0.002952	0.002643	0.002107	0.001639	0.001157	0.002952
2_H1	0.002750	0.002526	0.002735	0.003064	0.002423	0.001740	0.001324	0.001111	0.003064
2_H2	0.001547	0.001999	0.002188	0.002143	0.001988	0.001704	0.001261	0.000824	0.002188
3_H1	0.002704	0.002103	0.002240	0.002680	0.002053	0.001352	0.001074	0.001037	0.002704
3_H2	0.001602	0.001608	0.001698	0.001827	0.001493	0.001159	0.000901	0.000669	0.001827
4_H1	0.001948	0.002736	0.003168	0.003304	0.003233	0.002862	0.002158	0.001380	0.003304
4_H2	0.002067	0.003002	0.003431	0.003585	0.003274	0.002922	0.002363	0.001580	0.003585
5_H1	0.002215	0.002005	0.002120	0.002284	0.002018	0.001799	0.001355	0.000906	0.002284
5_H2	0.002128	0.002127	0.002252	0.002477	0.002071	0.001846	0.001480	0.001002	0.002477
6_H1	0.001636	0.001713	0.001814	0.001926	0.001606	0.001306	0.001002	0.000709	0.001926
6_H2	0.002472	0.002064	0.002177	0.002488	0.001900	0.001177	0.000969	0.000915	0.002488
7_H1	0.001656	0.001896	0.001951	0.002061	0.001676	0.001417	0.001047	0.000710	0.002061
7_H2	0.002535	0.002081	0.002217	0.002572	0.001955	0.001428	0.001101	0.000951	0.002572
8_H1	0.001788	0.001847	0.001999	0.002131	0.001836	0.001634	0.001238	0.000797	0.002131
8_H2	0.001851	0.001778	0.001891	0.002080	0.001696	0.001250	0.000952	0.000785	0.002080
9_H1	0.001969	0.002328	0.002592	0.002792	0.002604	0.002301	0.001802	0.001238	0.002792
9_H2	0.002236	0.002807	0.003142	0.003201	0.003085	0.002739	0.002174	0.001421	0.003201
10_H1	0.001625	0.001888	0.002120	0.002301	0.002131	0.001877	0.001474	0.000975	0.002301
10_H2	0.002179	0.003158	0.003900	0.004448	0.004310	0.003711	0.002865	0.001892	0.004448
11_H1	0.002847	0.002721	0.003237	0.003443	0.003320	0.002874	0.002152	0.001344	0.003443
11_H2	0.001589	0.002138	0.002247	0.002279	0.002061	0.001814	0.001510	0.001026	0.002279

Min	0.001547	0.001608	0.001698	0.001827	0.001493	0.001159	0.000901	0.000669	0.001827
Max	0.002847	0.003158	0.003900	0.004448	0.004310	0.003711	0.002865	0.001892	0.004448
Mean	0.002070	0.002250	0.002490	0.002688	0.002379	0.001983	0.001540	0.001079	0.002691
σ	0.000421	0.000433	0.000591	0.000646	0.000717	0.000697	0.000543	0.000312	0.000645
Mean-σ	0.001649	0.001816	0.001899	0.002041	0.001662	0.001286	0.000997	0.000767	0.002046
Mean+σ	0.002492	0.002683	0.003081	0.003334	0.003097	0.002680	0.002082	0.001391	0.003335
Q1	0.001658	0.001922	0.002120	0.002177	0.001914	0.001420	0.001081	0.000845	0.002211
Median	0.002018	0.002115	0.002244	0.002530	0.002066	0.001807	0.001415	0.001014	0.002530
Q3	0.002413	0.002555	0.002890	0.003086	0.002887	0.002529	0.001972	0.001297	0.003086

Table A.12 IDR results (Bldg: T1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002782	0.003027	0.003310	0.003515	0.003099	0.002482	0.001959	0.001467	0.003515
1_H2	0.002159	0.003271	0.003709	0.003809	0.003621	0.003191	0.002527	0.001750	0.003809
2_H1	0.001872	0.002308	0.002526	0.002486	0.002232	0.001884	0.001563	0.001209	0.002526
2_H2	0.003103	0.003045	0.003239	0.003615	0.002886	0.002354	0.001785	0.001466	0.003615
3_H1	0.001738	0.001857	0.001958	0.002032	0.001701	0.001573	0.001154	0.000854	0.002032
3_H2	0.003167	0.002717	0.002822	0.003351	0.002657	0.001820	0.001569	0.001489	0.003351
4_H1	0.002601	0.003633	0.004017	0.004183	0.003874	0.003251	0.002564	0.001848	0.004183
4_H2	0.002492	0.003434	0.003877	0.003992	0.003932	0.003628	0.002970	0.002082	0.003992
5_H1	0.002498	0.002534	0.002571	0.002765	0.002653	0.002341	0.001882	0.001345	0.002765
5_H2	0.002462	0.002730	0.003012	0.002988	0.002924	0.002701	0.002162	0.001473	0.003012
6_H1	0.002856	0.002474	0.002534	0.002937	0.002257	0.001504	0.001317	0.001263	0.002937
6_H2	0.002014	0.002212	0.002296	0.002405	0.001987	0.001648	0.001337	0.000978	0.002405
7_H1	0.002725	0.002680	0.002786	0.003042	0.002419	0.001773	0.001420	0.001243	0.003042
7_H2	0.002025	0.002249	0.002297	0.002401	0.002026	0.001529	0.001194	0.000980	0.002401
8_H1	0.002209	0.002311	0.002435	0.002649	0.002208	0.001700	0.001348	0.001129	0.002649
8_H2	0.002014	0.002428	0.002683	0.002946	0.002785	0.002546	0.001978	0.001359	0.002946
9_H1	0.002721	0.003721	0.004360	0.004727	0.004740	0.004375	0.003603	0.002536	0.004740
9_H2	0.002910	0.003699	0.004134	0.004416	0.004076	0.003497	0.002879	0.002114	0.004416
10_H1	0.002656	0.003822	0.004303	0.005049	0.005030	0.004370	0.003415	0.002364	0.005049
10_H2	0.001939	0.002531	0.002869	0.003093	0.003014	0.002727	0.002302	0.001694	0.003093
11_H1	0.002105	0.002672	0.002921	0.003064	0.003067	0.002856	0.002382	0.001693	0.003067
11_H2	0.003326	0.003152	0.003410	0.003709	0.003478	0.003008	0.002438	0.001750	0.003709

Min	0.001738	0.001857	0.001958	0.002032	0.001701	0.001504	0.001154	0.000854	0.002032
Max	0.003326	0.003822	0.004360	0.005049	0.005030	0.004375	0.003603	0.002536	0.005049
Mean	0.002472	0.002841	0.003094	0.003326	0.003030	0.002580	0.002079	0.001549	0.003330
σ	0.000454	0.000563	0.000707	0.000795	0.000890	0.000879	0.000713	0.000445	0.000793
Mean- σ	0.002018	0.002278	0.002387	0.002531	0.002141	0.001701	0.001367	0.001105	0.002536
Mean+ σ	0.002926	0.003405	0.003801	0.004121	0.003920	0.003459	0.002792	0.001994	0.004123
Q1	0.002045	0.002440	0.002543	0.002808	0.002298	0.001785	0.001456	0.001248	0.002808
Median	0.002495	0.002699	0.002895	0.003079	0.002905	0.002514	0.001969	0.001470	0.003080
Q3	0.002768	0.003241	0.003634	0.003784	0.003585	0.003145	0.002505	0.001750	0.003784

Table A.13 IDR results (Bldg: T2 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001612	0.001862	0.002077	0.001916	0.001841	0.001530	0.001222	0.000934	0.002077
1_H2	0.001281	0.001722	0.001855	0.001940	0.001927	0.001784	0.001474	0.001059	0.001940
2_H1	0.000971	0.001300	0.001336	0.001210	0.001097	0.000998	0.000845	0.000623	0.001336
2_H2	0.001598	0.001760	0.001644	0.001695	0.001659	0.001412	0.001035	0.000719	0.001760
3_H1	0.001320	0.001928	0.002100	0.002098	0.001970	0.001710	0.001333	0.000941	0.002100
3_H2	0.001584	0.001801	0.001901	0.001867	0.001809	0.001569	0.001192	0.000826	0.001901
4_H1	0.001316	0.001578	0.001734	0.001663	0.001520	0.001325	0.001053	0.000755	0.001734
4_H2	0.001249	0.001541	0.001726	0.001621	0.001515	0.001302	0.001009	0.000745	0.001726
5_H1	0.001594	0.001602	0.001601	0.001621	0.001671	0.001368	0.000971	0.000668	0.001671
5_H2	0.000658	0.000921	0.000916	0.000838	0.000747	0.000624	0.000477	0.000340	0.000921
6_H1	0.001214	0.001688	0.001911	0.001832	0.001721	0.001526	0.001252	0.000927	0.001911
6_H2	0.001858	0.002120	0.002496	0.002584	0.002522	0.002346	0.001979	0.001440	0.002584
7_H1	0.001407	0.001629	0.001729	0.001954	0.001970	0.001666	0.001456	0.001074	0.001970
7_H2	0.001552	0.002108	0.002410	0.002480	0.002380	0.002165	0.001791	0.001295	0.002480
8_H1	0.001537	0.002056	0.002569	0.002868	0.002813	0.002511	0.002170	0.001532	0.002868
8_H2	0.002027	0.002545	0.002899	0.003047	0.003007	0.002770	0.002289	0.001645	0.003047
9_H1	0.001476	0.002017	0.002162	0.002178	0.002062	0.001774	0.001353	0.000940	0.002178
9_H2	0.001040	0.001480	0.001553	0.001501	0.001367	0.001151	0.000876	0.000614	0.001553
10_H1	0.001732	0.001690	0.001705	0.001675	0.001725	0.001400	0.000993	0.000678	0.001732
10_H2	0.001146	0.001386	0.001366	0.001312	0.001189	0.000979	0.000719	0.000499	0.001386
11_H1	0.001631	0.001778	0.001803	0.001820	0.001810	0.001544	0.001119	0.000778	0.001820
11_H2	0.001259	0.001571	0.001591	0.001598	0.001527	0.001304	0.000967	0.000661	0.001598

Min	0.000658	0.000921	0.000916	0.000838	0.000747	0.000624	0.000477	0.000340	0.000921
Max	0.002027	0.002545	0.002899	0.003047	0.003007	0.002770	0.002289	0.001645	0.003047
Mean	0.001412	0.001731	0.001867	0.001878	0.001811	0.001580	0.001253	0.000895	0.001922
σ	0.000309	0.000334	0.000450	0.000520	0.000531	0.000509	0.000459	0.000335	0.000494
Mean-σ	0.001103	0.001397	0.001417	0.001358	0.001280	0.001071	0.000794	0.000560	0.001429
Mean+σ	0.001721	0.002065	0.002318	0.002398	0.002343	0.002089	0.001713	0.001230	0.002416
Q1	0.001252	0.001573	0.001612	0.001621	0.001522	0.001309	0.000977	0.000671	0.001685
Median	0.001442	0.001706	0.001769	0.001826	0.001767	0.001528	0.001156	0.000802	0.001861
Q3	0.001597	0.001912	0.002094	0.002062	0.001970	0.001758	0.001430	0.001030	0.002094

Table A.14 IDR results (Bldg: T2 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001416	0.001994	0.002113	0.002044	0.001796	0.001645	0.001334	0.000914	0.002113
1_H2	0.001660	0.002061	0.002196	0.002226	0.001980	0.001614	0.001276	0.000938	0.002226
2_H1	0.001599	0.001944	0.002020	0.002009	0.001776	0.001482	0.001209	0.000900	0.002020
2_H2	0.001048	0.001488	0.001529	0.001434	0.001367	0.001280	0.001048	0.000715	0.001529
3_H1	0.001578	0.002021	0.002156	0.002178	0.002018	0.001730	0.001389	0.001002	0.002178
3_H2	0.001378	0.002039	0.002215	0.002223	0.002088	0.001817	0.001426	0.000993	0.002223
4_H1	0.001313	0.001818	0.001984	0.001894	0.001784	0.001596	0.001241	0.000868	0.001984
4_H2	0.001296	0.001885	0.002039	0.001997	0.001867	0.001639	0.001307	0.000919	0.002039
5_H1	0.000722	0.001040	0.001084	0.001037	0.000932	0.000781	0.000595	0.000411	0.001084
5_H2	0.001423	0.001654	0.001758	0.001765	0.001608	0.001341	0.001052	0.000761	0.001765
6_H1	0.001695	0.002539	0.002917	0.003021	0.002997	0.002779	0.002267	0.001559	0.003021
6_H2	0.001394	0.001970	0.002199	0.002264	0.002195	0.001948	0.001520	0.001026	0.002264
7_H1	0.001623	0.002268	0.002500	0.002561	0.002478	0.002300	0.001833	0.001234	0.002561
7_H2	0.001368	0.001963	0.002145	0.002269	0.002125	0.001975	0.001614	0.001051	0.002269
8_H1	0.001946	0.002940	0.003335	0.003452	0.003372	0.003094	0.002529	0.001753	0.003452
8_H2	0.001643	0.002158	0.002907	0.003349	0.003319	0.002942	0.002382	0.001656	0.003349
9_H1	0.001242	0.001808	0.001937	0.001912	0.001768	0.001518	0.001194	0.000837	0.001937
9_H2	0.001654	0.002385	0.002629	0.002657	0.002450	0.002083	0.001635	0.001150	0.002657
10_H1	0.001255	0.001628	0.001668	0.001610	0.001412	0.001154	0.000905	0.000662	0.001668
10_H2	0.001597	0.001731	0.001845	0.001978	0.001724	0.001397	0.001101	0.000830	0.001978
11_H1	0.001365	0.001857	0.001982	0.001978	0.001789	0.001485	0.001174	0.000855	0.001982
11_H2	0.001654	0.002013	0.002135	0.002187	0.001970	0.001631	0.001310	0.000970	0.002187

Min	0.000722	0.001040	0.001084	0.001037	0.000932	0.000781	0.000595	0.000411	0.001084
Max	0.001946	0.002940	0.003335	0.003452	0.003372	0.003094	0.002529	0.001753	0.003452
Mean	0.001449	0.001964	0.002150	0.002184	0.002037	0.001783	0.001425	0.001000	0.002204
σ	0.000258	0.000379	0.000491	0.000567	0.000596	0.000571	0.000473	0.000317	0.000550
Mean- σ	0.001190	0.001585	0.001659	0.001617	0.001441	0.001212	0.000951	0.000683	0.001654
Mean+ σ	0.001707	0.002343	0.002641	0.002751	0.002633	0.002354	0.001898	0.001317	0.002754
Q1	0.001326	0.001811	0.001948	0.001929	0.001770	0.001483	0.001179	0.000842	0.001979
Median	0.001420	0.001967	0.002124	0.002111	0.001919	0.001635	0.001309	0.000929	0.002146
Q3	0.001638	0.002056	0.002211	0.002268	0.002178	0.001968	0.001591	0.001045	0.002268

Table A.15 IDR results (Bldg: T2 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001599	0.002030	0.002336	0.002196	0.001902	0.001661	0.001338	0.000994	0.002336
1_H2	0.002111	0.002088	0.002432	0.002269	0.002256	0.001897	0.001499	0.001151	0.002432
2_H1	0.001859	0.002383	0.002438	0.002447	0.002478	0.002220	0.001628	0.001106	0.002478
2_H2	0.003222	0.002864	0.002671	0.002892	0.003083	0.002441	0.001661	0.001099	0.003222
3_H1	0.001458	0.001996	0.002366	0.002576	0.002570	0.002351	0.001909	0.001353	0.002576
3_H2	0.002139	0.002708	0.002933	0.003017	0.002919	0.002474	0.001932	0.001359	0.003017
4_H1	0.001914	0.002047	0.002126	0.002081	0.001919	0.001549	0.001154	0.000799	0.002126
4_H2	0.002393	0.002087	0.001938	0.002143	0.002319	0.001857	0.001254	0.000959	0.002393
5_H1	0.002176	0.002346	0.002269	0.002473	0.002495	0.002076	0.001414	0.000899	0.002495
5_H2	0.001733	0.002031	0.001996	0.002079	0.002013	0.001670	0.001188	0.000838	0.002079
6_H1	0.001731	0.002015	0.002010	0.002161	0.002174	0.001862	0.001342	0.000889	0.002174
6_H2	0.001849	0.002433	0.002578	0.002551	0.002456	0.002136	0.001569	0.001041	0.002578
7_H1	0.001431	0.001614	0.001753	0.001687	0.001514	0.001266	0.000964	0.000709	0.001753
7_H2	0.001730	0.001901	0.001865	0.001880	0.001824	0.001463	0.001073	0.000740	0.001901
8_H1	0.002056	0.001951	0.002042	0.001929	0.001746	0.001495	0.001241	0.000923	0.002056
8_H2	0.001883	0.002454	0.002642	0.002803	0.002763	0.002402	0.001812	0.001241	0.002803
9_H1	0.002381	0.003069	0.003239	0.003357	0.003184	0.002660	0.001943	0.001309	0.003357
9_H2	0.002306	0.002856	0.002952	0.003155	0.003108	0.002610	0.001989	0.001462	0.003155
10_H1	0.002680	0.002946	0.002965	0.003299	0.003393	0.002944	0.002142	0.001562	0.003393
10_H2	0.002763	0.003024	0.003314	0.003526	0.003493	0.003203	0.002635	0.001895	0.003526
11_H1	0.002196	0.002288	0.002166	0.002499	0.002594	0.002140	0.001676	0.001276	0.002594
11_H2	0.002397	0.002183	0.002067	0.002207	0.002233	0.001868	0.001501	0.001079	0.002397

Min	0.001431	0.001614	0.001753	0.001687	0.001514	0.001266	0.000964	0.000709	0.001753
Max	0.003222	0.003069	0.003314	0.003526	0.003493	0.003203	0.002635	0.001895	0.003526
Mean	0.002091	0.002332	0.002414	0.002510	0.002474	0.002102	0.001585	0.001122	0.002584
σ	0.000440	0.000414	0.000449	0.000515	0.000552	0.000502	0.000401	0.000292	0.000505
Mean- σ	0.001651	0.001919	0.001965	0.001995	0.001922	0.001600	0.001184	0.000830	0.002079
Mean+ σ	0.002531	0.002746	0.002863	0.003026	0.003027	0.002604	0.001986	0.001414	0.003089
Q1	0.001762	0.002030	0.002048	0.002148	0.002053	0.001717	0.001275	0.000905	0.002215
Median	0.002084	0.002236	0.002351	0.002460	0.002467	0.002106	0.001535	0.001089	0.002487
Q3	0.002362	0.002645	0.002664	0.002870	0.002880	0.002431	0.001885	0.001301	0.002964

Table A.16 IDR results (Bldg: T2 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001861	0.002218	0.002404	0.002451	0.002204	0.001868	0.001460	0.001098	0.002451
1_H2	0.001639	0.002221	0.002439	0.002334	0.002105	0.001854	0.001452	0.000986	0.002439
2_H1	0.002822	0.002991	0.003180	0.003431	0.002928	0.002314	0.001855	0.001404	0.003431
2_H2	0.001976	0.002738	0.002979	0.003001	0.002722	0.002358	0.001949	0.001403	0.003001
3_H1	0.002237	0.003036	0.003475	0.003587	0.003285	0.002767	0.002211	0.001522	0.003587
3_H2	0.001534	0.002237	0.002450	0.002624	0.002702	0.002502	0.001994	0.001346	0.002702
4_H1	0.002104	0.002127	0.002346	0.002636	0.002284	0.001841	0.001472	0.001106	0.002636
4_H2	0.001918	0.002406	0.002690	0.002697	0.002515	0.002141	0.001619	0.001088	0.002697
5_H1	0.001621	0.001960	0.002064	0.002112	0.001883	0.001521	0.001214	0.000909	0.002112
5_H2	0.002094	0.002263	0.002387	0.002554	0.002218	0.001749	0.001395	0.001069	0.002554
6_H1	0.001934	0.002613	0.002838	0.002867	0.002590	0.002162	0.001760	0.001307	0.002867
6_H2	0.001798	0.002366	0.002610	0.002732	0.002533	0.002140	0.001715	0.001247	0.002732
7_H1	0.001757	0.002037	0.002153	0.002189	0.002028	0.001732	0.001376	0.000982	0.002189
7_H2	0.001417	0.001848	0.001981	0.001926	0.001772	0.001516	0.001162	0.000795	0.001981
8_H1	0.001980	0.002748	0.003087	0.003223	0.003008	0.002556	0.002013	0.001424	0.003223
8_H2	0.001917	0.002166	0.002352	0.002262	0.002126	0.001955	0.001589	0.001083	0.002352
9_H1	0.002465	0.003427	0.003934	0.004198	0.003923	0.003274	0.002563	0.001794	0.004198
9_H2	0.002307	0.003203	0.003598	0.003666	0.003252	0.002639	0.002098	0.001527	0.003666
10_H1	0.002708	0.003549	0.004063	0.004223	0.004118	0.003746	0.003040	0.002114	0.004223
10_H2	0.002615	0.003144	0.003503	0.003781	0.003498	0.003074	0.002619	0.001826	0.003781
11_H1	0.002274	0.002322	0.002478	0.002620	0.002256	0.001963	0.001550	0.001104	0.002620
11_H2	0.002119	0.002451	0.002714	0.003022	0.002743	0.002384	0.001914	0.001387	0.003022

Min	0.001417	0.001848	0.001981	0.001926	0.001772	0.001516	0.001162	0.000795	0.001981
Max	0.002822	0.003549	0.004063	0.004223	0.004118	0.003746	0.003040	0.002114	0.004223
Mean	0.002050	0.002549	0.002806	0.002915	0.002668	0.002275	0.001819	0.001296	0.002930
σ	0.000374	0.000488	0.000598	0.000658	0.000636	0.000570	0.000476	0.000324	0.000645
Mean- σ	0.001675	0.002061	0.002208	0.002257	0.002032	0.001705	0.001344	0.000973	0.002286
Mean+ σ	0.002424	0.003037	0.003403	0.003573	0.003304	0.002845	0.002295	0.001620	0.003575
Q1	0.001814	0.002219	0.002391	0.002477	0.002208	0.001858	0.001463	0.001084	0.002477
Median	0.001978	0.002386	0.002650	0.002715	0.002562	0.002152	0.001738	0.001277	0.002717
Q3	0.002265	0.002930	0.003157	0.003379	0.002988	0.002543	0.002008	0.001419	0.003379

Table A.17 IDR results (Bldg: T2 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002065	0.002820	0.003205	0.003377	0.003283	0.002899	0.002282	0.001606	0.003377
1_H2	0.003204	0.002680	0.002681	0.002983	0.003033	0.002551	0.001780	0.001150	0.003204
2_H1	0.003479	0.002973	0.002425	0.002883	0.003118	0.002463	0.001471	0.001101	0.003479
2_H2	0.001862	0.002046	0.002281	0.002233	0.002022	0.001732	0.001371	0.000986	0.002281
3_H1	0.003521	0.002542	0.002052	0.002403	0.002832	0.002245	0.001239	0.001085	0.003521
3_H2	0.001922	0.001787	0.001685	0.001742	0.001824	0.001469	0.000993	0.000705	0.001922
4_H1	0.002417	0.002871	0.003477	0.003635	0.003483	0.003083	0.002457	0.001747	0.003635
4_H2	0.002381	0.003290	0.003660	0.003835	0.003690	0.003158	0.002627	0.001875	0.003835
5_H1	0.002760	0.002221	0.002537	0.002565	0.002394	0.002111	0.001703	0.001217	0.002760
5_H2	0.002584	0.002318	0.002131	0.002300	0.002399	0.002127	0.001683	0.001178	0.002584
6_H1	0.002019	0.002003	0.001787	0.001964	0.002010	0.001634	0.001149	0.000815	0.002019
6_H2	0.003199	0.002430	0.001801	0.002265	0.002581	0.002016	0.001052	0.000785	0.003199
7_H1	0.001986	0.002043	0.001924	0.001994	0.001994	0.001602	0.001115	0.000827	0.002043
7_H2	0.003207	0.002464	0.002021	0.002341	0.002590	0.002015	0.001237	0.000900	0.003207
8_H1	0.002176	0.002218	0.002230	0.002350	0.002367	0.001974	0.001560	0.001163	0.002367
8_H2	0.002323	0.002096	0.001868	0.002073	0.002221	0.001803	0.001102	0.000768	0.002323
9_H1	0.002500	0.002783	0.002877	0.003130	0.003159	0.002748	0.002140	0.001489	0.003159
9_H2	0.002860	0.003114	0.003531	0.003721	0.003723	0.003412	0.002739	0.001922	0.003723
10_H1	0.001908	0.002084	0.002273	0.002398	0.002372	0.002110	0.001647	0.001150	0.002398
10_H2	0.002448	0.003351	0.004266	0.004746	0.004945	0.004352	0.003251	0.002175	0.004945
11_H1	0.003791	0.002875	0.003344	0.003573	0.003484	0.003074	0.002402	0.001674	0.003791
11_H2	0.001893	0.002340	0.002366	0.002428	0.002455	0.002175	0.001816	0.001304	0.002455

Min	0.001862	0.001787	0.001685	0.001742	0.001824	0.001469	0.000993	0.000705	0.001922
Max	0.003791	0.003351	0.004266	0.004746	0.004945	0.004352	0.003251	0.002175	0.004945
Mean	0.002568	0.002516	0.002565	0.002770	0.002817	0.002398	0.001764	0.001256	0.003010
σ	0.000600	0.000445	0.000721	0.000764	0.000749	0.000704	0.000633	0.000420	0.000760
Mean- σ	0.001968	0.002070	0.001843	0.002006	0.002069	0.001694	0.001132	0.000836	0.002250
Mean+ σ	0.003168	0.002961	0.003286	0.003534	0.003566	0.003102	0.002397	0.001675	0.003770
Q1	0.002031	0.002127	0.002029	0.002274	0.002368	0.001984	0.001238	0.000922	0.002375
Median	0.002433	0.002447	0.002324	0.002416	0.002586	0.002151	0.001665	0.001157	0.003179
Q3	0.003114	0.002858	0.003123	0.003315	0.003252	0.002861	0.002247	0.001577	0.003511

Table A.18 IDR results (Bldg: T2 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002757	0.002978	0.003306	0.003512	0.003179	0.002572	0.002014	0.001474	0.003512
1_H2	0.002127	0.003245	0.003709	0.003836	0.003660	0.003226	0.002558	0.001769	0.003836
2_H1	0.001811	0.002415	0.002689	0.002637	0.002441	0.002127	0.001670	0.001136	0.002689
2_H2	0.003076	0.002984	0.003146	0.003485	0.002845	0.002147	0.001683	0.001339	0.003485
3_H1	0.001698	0.001834	0.001872	0.001987	0.001692	0.001440	0.001153	0.000830	0.001987
3_H2	0.003088	0.002571	0.002627	0.003146	0.002527	0.001702	0.001425	0.001316	0.003146
4_H1	0.002687	0.003947	0.004450	0.004558	0.004229	0.003607	0.002857	0.002026	0.004558
4_H2	0.002461	0.003400	0.004065	0.004309	0.004158	0.003660	0.002897	0.001962	0.004309
5_H1	0.002442	0.002463	0.002620	0.002896	0.002499	0.002271	0.001887	0.001353	0.002896
5_H2	0.002449	0.002570	0.002957	0.003028	0.002968	0.002686	0.002097	0.001381	0.003028
6_H1	0.002804	0.002378	0.002423	0.002817	0.002208	0.001478	0.001237	0.001131	0.002817
6_H2	0.001923	0.002091	0.002182	0.002291	0.001919	0.001597	0.001264	0.000881	0.002291
7_H1	0.002703	0.002612	0.002700	0.002901	0.002388	0.001733	0.001391	0.001173	0.002901
7_H2	0.002049	0.002335	0.002458	0.002548	0.002186	0.001664	0.001290	0.001000	0.002548
8_H1	0.002149	0.002215	0.002322	0.002509	0.002136	0.001590	0.001277	0.001031	0.002509
8_H2	0.002024	0.002317	0.002610	0.002759	0.002521	0.002367	0.001833	0.001223	0.002759
9_H1	0.002660	0.003453	0.004050	0.004390	0.004402	0.004046	0.003312	0.002325	0.004402
9_H2	0.002589	0.003319	0.003687	0.003905	0.003608	0.003136	0.002622	0.001941	0.003905
10_H1	0.002572	0.003704	0.004205	0.005016	0.005005	0.004339	0.003386	0.002339	0.005016
10_H2	0.001811	0.002562	0.002825	0.002946	0.002863	0.002556	0.002107	0.001522	0.002946
11_H1	0.001982	0.002627	0.002922	0.003056	0.002826	0.002536	0.002134	0.001520	0.003056
11_H2	0.003230	0.003054	0.003342	0.003500	0.003358	0.002973	0.002350	0.001613	0.003500

Min	0.001698	0.001834	0.001872	0.001987	0.001692	0.001440	0.001153	0.000830	0.001987
Max	0.003230	0.003947	0.004450	0.005016	0.005005	0.004339	0.003386	0.002339	0.005016
Mean	0.002413	0.002776	0.003053	0.003274	0.002983	0.002521	0.002020	0.001468	0.003277
σ	0.000448	0.000552	0.000711	0.000787	0.000878	0.000862	0.000685	0.000435	0.000786
Mean-σ	0.001965	0.002224	0.002342	0.002488	0.002105	0.001659	0.001335	0.001032	0.002492
Mean+σ	0.002861	0.003328	0.003764	0.004061	0.003860	0.003383	0.002705	0.001903	0.004063
Q1	0.002030	0.002387	0.002613	0.002774	0.002401	0.001710	0.001400	0.001145	0.002774
Median	0.002455	0.002592	0.002874	0.003042	0.002836	0.002452	0.001951	0.001367	0.003042
Q3	0.002699	0.003197	0.003601	0.003755	0.003546	0.003095	0.002506	0.001730	0.003755

Table A.19 IDR results (Bldg: T3 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001804	0.002117	0.002207	0.002168	0.002113	0.001812	0.001346	0.001046	0.002207
1_H2	0.001432	0.001940	0.002011	0.001969	0.001906	0.001790	0.001535	0.001160	0.002011
2_H1	0.001058	0.001461	0.001533	0.001424	0.001301	0.001190	0.001037	0.000803	0.001533
2_H2	0.001749	0.001990	0.001843	0.001859	0.001821	0.001584	0.001203	0.000836	0.001990
3_H1	0.001447	0.002111	0.002307	0.002327	0.002220	0.001977	0.001609	0.001190	0.002327
3_H2	0.001691	0.002008	0.001983	0.002011	0.001961	0.001735	0.001365	0.000982	0.002011
4_H1	0.001423	0.001821	0.002019	0.001964	0.001813	0.001605	0.001322	0.000992	0.002019
4_H2	0.001375	0.001705	0.001977	0.001907	0.001708	0.001510	0.001291	0.001002	0.001977
5_H1	0.001646	0.001688	0.001695	0.001706	0.001801	0.001541	0.001123	0.000803	0.001801
5_H2	0.000715	0.001008	0.001022	0.000976	0.000889	0.000762	0.000609	0.000455	0.001022
6_H1	0.001363	0.001783	0.001990	0.001914	0.001851	0.001681	0.001396	0.001042	0.001990
6_H2	0.001902	0.002551	0.002935	0.003007	0.002909	0.002706	0.002332	0.001768	0.003007
7_H1	0.001487	0.001798	0.001884	0.002104	0.002156	0.001872	0.001655	0.001287	0.002156
7_H2	0.001695	0.002273	0.002506	0.002620	0.002558	0.002372	0.002029	0.001537	0.002620
8_H1	0.001647	0.002089	0.002678	0.003077	0.003125	0.002821	0.002305	0.001711	0.003125
8_H2	0.002175	0.003001	0.003402	0.003552	0.003477	0.003209	0.002717	0.002029	0.003552
9_H1	0.001727	0.002428	0.002620	0.002669	0.002558	0.002248	0.001783	0.001291	0.002669
9_H2	0.001184	0.001661	0.001793	0.001702	0.001591	0.001392	0.001109	0.000811	0.001793
10_H1	0.001816	0.001839	0.002017	0.001840	0.001888	0.001590	0.001166	0.000958	0.002017
10_H2	0.001245	0.001575	0.001543	0.001481	0.001363	0.001152	0.000883	0.000682	0.001575
11_H1	0.001809	0.002033	0.001965	0.002048	0.002052	0.001799	0.001359	0.000941	0.002052
11_H2	0.001399	0.001779	0.001813	0.001820	0.001756	0.001536	0.001189	0.000843	0.001820

Min	0.000715	0.001008	0.001022	0.000976	0.000889	0.000762	0.000609	0.000455	0.001022
Max	0.002175	0.003001	0.003402	0.003552	0.003477	0.003209	0.002717	0.002029	0.003552
Mean	0.001536	0.001939	0.002079	0.002098	0.002037	0.001813	0.001471	0.001099	0.002149
σ	0.000319	0.000406	0.000513	0.000589	0.000599	0.000570	0.000504	0.000380	0.000564
Mean-σ	0.001216	0.001533	0.001566	0.001509	0.001438	0.001243	0.000967	0.000719	0.001585
Mean+σ	0.001855	0.002346	0.002593	0.002686	0.002637	0.002383	0.001975	0.001478	0.002713
Q1	0.001381	0.001724	0.001821	0.001825	0.001767	0.001537	0.001172	0.000838	0.001859
Median	0.001567	0.001890	0.001987	0.001967	0.001897	0.001708	0.001353	0.000997	0.002014
Q3	0.001744	0.002106	0.002282	0.002287	0.002204	0.001951	0.001644	0.001263	0.002297

Table A.20 IDR results (Bldg: T3 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001474	0.002055	0.002126	0.002056	0.001870	0.001666	0.001391	0.000994	0.002126
1_H2	0.001815	0.002020	0.002090	0.002036	0.001978	0.001650	0.001223	0.000944	0.002090
2_H1	0.001742	0.001984	0.001861	0.001897	0.001858	0.001592	0.001163	0.000764	0.001984
2_H2	0.001151	0.001461	0.001589	0.001482	0.001330	0.001212	0.001047	0.000766	0.001589
3_H1	0.001713	0.002079	0.002157	0.002170	0.002117	0.001846	0.001401	0.000940	0.002170
3_H2	0.001363	0.001989	0.002153	0.002174	0.002063	0.001805	0.001407	0.000963	0.002174
4_H1	0.001397	0.001828	0.002131	0.002044	0.001847	0.001610	0.001310	0.000945	0.002131
4_H2	0.001428	0.001826	0.002011	0.001947	0.001799	0.001583	0.001262	0.000882	0.002011
5_H1	0.000704	0.001008	0.001070	0.001031	0.000936	0.000794	0.000617	0.000429	0.001070
5_H2	0.001613	0.001669	0.001712	0.001730	0.001719	0.001411	0.001034	0.000682	0.001730
6_H1	0.001902	0.002574	0.003057	0.003143	0.003014	0.002765	0.002320	0.001653	0.003143
6_H2	0.001469	0.001985	0.002309	0.002413	0.002333	0.002068	0.001632	0.001117	0.002413
7_H1	0.001675	0.002267	0.002461	0.002572	0.002507	0.002314	0.001925	0.001356	0.002572
7_H2	0.001492	0.002027	0.002178	0.002204	0.002246	0.001912	0.001688	0.001233	0.002246
8_H1	0.002132	0.002855	0.003201	0.003316	0.003230	0.002953	0.002431	0.001703	0.003316
8_H2	0.001684	0.002295	0.003016	0.003483	0.003516	0.003131	0.002467	0.001684	0.003516
9_H1	0.001345	0.001920	0.002079	0.002039	0.001909	0.001631	0.001242	0.000841	0.002079
9_H2	0.001668	0.002341	0.002509	0.002546	0.002414	0.002070	0.001573	0.001061	0.002546
10_H1	0.001320	0.001634	0.001587	0.001547	0.001476	0.001241	0.000883	0.000591	0.001634
10_H2	0.001836	0.001868	0.001863	0.001880	0.001945	0.001599	0.001064	0.000775	0.001945
11_H1	0.001445	0.001911	0.001976	0.001974	0.001867	0.001586	0.001174	0.000773	0.001976
11_H2	0.001817	0.002039	0.001975	0.002061	0.002036	0.001729	0.001242	0.000874	0.002061

Min	0.000704	0.001008	0.001070	0.001031	0.000936	0.000794	0.000617	0.000429	0.001070
Max	0.002132	0.002855	0.003201	0.003483	0.003516	0.003131	0.002467	0.001703	0.003516
Mean	0.001554	0.001983	0.002141	0.002170	0.002091	0.001826	0.001432	0.000999	0.002206
σ	0.000298	0.000375	0.000496	0.000578	0.000591	0.000558	0.000485	0.000342	0.000561
Mean- σ	0.001255	0.001609	0.001645	0.001592	0.001500	0.001267	0.000947	0.000656	0.001644
Mean+ σ	0.001852	0.002358	0.002638	0.002748	0.002683	0.002384	0.001916	0.001341	0.002767
Q1	0.001405	0.001838	0.001891	0.001910	0.001850	0.001588	0.001166	0.000774	0.001978
Median	0.001553	0.001987	0.002108	0.002050	0.001962	0.001658	0.001286	0.000942	0.002108
Q3	0.001735	0.002073	0.002276	0.002361	0.002311	0.002029	0.001617	0.001103	0.002371

Table A.21 IDR results (Bldg: T3 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001790	0.002290	0.002478	0.002430	0.002193	0.001906	0.001607	0.001238	0.002478
1_H2	0.002107	0.002380	0.002643	0.002553	0.002516	0.002163	0.001617	0.001274	0.002643
2_H1	0.002057	0.002769	0.002883	0.002879	0.002713	0.002533	0.001968	0.001329	0.002883
2_H2	0.003352	0.003112	0.002881	0.003034	0.003322	0.002772	0.001837	0.001242	0.003352
3_H1	0.001683	0.002215	0.002565	0.002777	0.002806	0.002615	0.002195	0.001626	0.002806
3_H2	0.002435	0.003094	0.003374	0.003505	0.003370	0.002904	0.002335	0.001718	0.003505
4_H1	0.002122	0.002348	0.002639	0.002632	0.002429	0.002080	0.001641	0.001200	0.002639
4_H2	0.002498	0.002287	0.002164	0.002252	0.002477	0.002073	0.001515	0.001295	0.002498
5_H1	0.002443	0.002624	0.002496	0.002670	0.002717	0.002327	0.001651	0.001074	0.002717
5_H2	0.001852	0.002187	0.002104	0.002140	0.002064	0.001721	0.001285	0.001013	0.002187
6_H1	0.001910	0.002310	0.002318	0.002456	0.002480	0.002188	0.001656	0.001140	0.002480
6_H2	0.001982	0.002652	0.002744	0.002745	0.002680	0.002410	0.001844	0.001270	0.002745
7_H1	0.001586	0.001872	0.002066	0.002033	0.001874	0.001618	0.001290	0.000951	0.002066
7_H2	0.001894	0.002111	0.002062	0.002055	0.001988	0.001756	0.001388	0.000999	0.002111
8_H1	0.002162	0.002109	0.002327	0.002201	0.001931	0.001693	0.001467	0.001152	0.002327
8_H2	0.002113	0.002803	0.003017	0.003194	0.003166	0.002806	0.002196	0.001563	0.003194
9_H1	0.002540	0.003260	0.003384	0.003482	0.003370	0.002961	0.002286	0.001599	0.003482
9_H2	0.002662	0.003283	0.003466	0.003747	0.003767	0.003272	0.002538	0.001943	0.003767
10_H1	0.003022	0.003420	0.003370	0.003600	0.003725	0.003297	0.002717	0.002062	0.003725
10_H2	0.003069	0.003548	0.004019	0.004270	0.004225	0.003886	0.003262	0.002431	0.004270
11_H1	0.002362	0.002552	0.002392	0.002706	0.002827	0.002401	0.002047	0.001641	0.002827
11_H2	0.002612	0.002489	0.002359	0.002424	0.002464	0.002117	0.001747	0.001305	0.002612

Min	0.001586	0.001872	0.002062	0.002033	0.001874	0.001618	0.001285	0.000951	0.002066
Max	0.003352	0.003548	0.004019	0.004270	0.004225	0.003886	0.003262	0.002431	0.004270
Mean	0.002284	0.002623	0.002716	0.002808	0.002777	0.002432	0.001913	0.001412	0.002878
σ	0.000465	0.000477	0.000531	0.000603	0.000641	0.000590	0.000498	0.000376	0.000588
Mean- σ	0.001820	0.002147	0.002185	0.002206	0.002137	0.001842	0.001416	0.001036	0.002290
Mean+ σ	0.002749	0.003100	0.003247	0.003411	0.003418	0.003022	0.002411	0.001788	0.003466
Q1	0.001928	0.002288	0.002335	0.002426	0.002438	0.002075	0.001610	0.001164	0.002485
Median	0.002142	0.002521	0.002602	0.002688	0.002697	0.002364	0.001792	0.001285	0.002731
Q3	0.002530	0.003021	0.002984	0.003154	0.003283	0.002798	0.002196	0.001619	0.003313

Table A.22 IDR results (Bldg: T3 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002111	0.002371	0.002599	0.002566	0.002450	0.002040	0.001671	0.001271	0.002599
1_H2	0.001825	0.002296	0.002619	0.002471	0.002202	0.001874	0.001555	0.001109	0.002619
2_H1	0.003368	0.003132	0.003048	0.003181	0.003422	0.002756	0.001832	0.001194	0.003422
2_H2	0.001983	0.002588	0.002677	0.002777	0.002790	0.002448	0.001761	0.001153	0.002790
3_H1	0.002378	0.002958	0.003257	0.003397	0.003320	0.002851	0.002222	0.001526	0.003397
3_H2	0.001676	0.002299	0.002524	0.002691	0.002693	0.002472	0.002014	0.001395	0.002693
4_H1	0.002540	0.002363	0.002181	0.002488	0.002686	0.002185	0.001416	0.001138	0.002686
4_H2	0.002106	0.002307	0.002582	0.002609	0.002427	0.002052	0.001548	0.001044	0.002609
5_H1	0.001791	0.002095	0.002043	0.002145	0.002125	0.001804	0.001290	0.000855	0.002145
5_H2	0.002327	0.002334	0.002218	0.002407	0.002442	0.002029	0.001355	0.000946	0.002442
6_H1	0.002083	0.002724	0.002834	0.002924	0.002848	0.002445	0.001780	0.001139	0.002924
6_H2	0.001977	0.002520	0.002629	0.002780	0.002768	0.002394	0.001762	0.001141	0.002780
7_H1	0.001938	0.002153	0.002126	0.002146	0.002061	0.001780	0.001345	0.000917	0.002153
7_H2	0.001534	0.001770	0.001908	0.001846	0.001661	0.001402	0.001134	0.000829	0.001908
8_H1	0.002112	0.002658	0.002871	0.003034	0.002971	0.002562	0.001909	0.001256	0.003034
8_H2	0.002168	0.002258	0.002538	0.002439	0.002210	0.001991	0.001690	0.001222	0.002538
9_H1	0.002657	0.003564	0.003864	0.004164	0.004129	0.003526	0.002556	0.001746	0.004164
9_H2	0.002470	0.003384	0.003674	0.003806	0.003577	0.002940	0.002116	0.001360	0.003806
10_H1	0.003038	0.003448	0.003859	0.004068	0.004004	0.003660	0.002985	0.002087	0.004068
10_H2	0.002858	0.003246	0.003414	0.003639	0.003734	0.003237	0.002746	0.001997	0.003734
11_H1	0.002576	0.002350	0.002355	0.002327	0.002423	0.001949	0.001528	0.001065	0.002576
11_H2	0.002318	0.002477	0.002547	0.002754	0.002854	0.002327	0.001867	0.001417	0.002854

Min	0.001534	0.001770	0.001908	0.001846	0.001661	0.001402	0.001134	0.000829	0.001908
Max	0.003368	0.003564	0.003864	0.004164	0.004129	0.003660	0.002985	0.002087	0.004164
Mean	0.002265	0.002604	0.002744	0.002848	0.002809	0.002397	0.001822	0.001264	0.002906
σ	0.000449	0.000483	0.000566	0.000628	0.000653	0.000579	0.000472	0.000332	0.000615
Mean- σ	0.001816	0.002121	0.002178	0.002220	0.002156	0.001818	0.001349	0.000931	0.002291
Mean+ σ	0.002714	0.003088	0.003310	0.003477	0.003462	0.002975	0.002294	0.001596	0.003521
Q1	0.001979	0.002301	0.002397	0.002447	0.002424	0.002001	0.001533	0.001076	0.002582
Median	0.002140	0.002424	0.002609	0.002723	0.002731	0.002361	0.001762	0.001174	0.002737
Q3	0.002523	0.002900	0.003004	0.003144	0.003233	0.002708	0.001988	0.001386	0.003306

Table A.23 IDR results (Bldg: T3 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002398	0.003239	0.003640	0.003784	0.003655	0.003248	0.002630	0.001926	0.003784
1_H2	0.003374	0.003024	0.002978	0.003236	0.003294	0.002824	0.002025	0.001335	0.003374
2_H1	0.003704	0.003397	0.002764	0.003128	0.003386	0.002782	0.001808	0.001567	0.003704
2_H2	0.002029	0.002269	0.002532	0.002476	0.002251	0.001997	0.001542	0.001177	0.002532
3_H1	0.003758	0.002966	0.002390	0.002594	0.003087	0.002587	0.001513	0.001380	0.003758
3_H2	0.002006	0.001944	0.001966	0.001817	0.001931	0.001624	0.001183	0.001001	0.002006
4_H1	0.002619	0.003240	0.003901	0.004090	0.003925	0.003502	0.002875	0.002144	0.004090
4_H2	0.002633	0.003694	0.004086	0.004280	0.004241	0.003781	0.002962	0.002193	0.004280
5_H1	0.002886	0.002521	0.003007	0.003067	0.002895	0.002596	0.002169	0.001629	0.003067
5_H2	0.002766	0.002593	0.002373	0.002553	0.002601	0.002400	0.001960	0.001425	0.002766
6_H1	0.002243	0.002342	0.002078	0.002202	0.002257	0.001904	0.001344	0.000995	0.002342
6_H2	0.003425	0.002818	0.002055	0.002453	0.002822	0.002332	0.001310	0.001020	0.003425
7_H1	0.002169	0.002295	0.002067	0.002195	0.002250	0.001885	0.001258	0.000947	0.002295
7_H2	0.003338	0.002883	0.002337	0.002585	0.002761	0.002289	0.001417	0.001165	0.003338
8_H1	0.002321	0.002638	0.002624	0.002798	0.002816	0.002420	0.001947	0.001520	0.002816
8_H2	0.002562	0.002450	0.002123	0.002334	0.002510	0.002112	0.001358	0.000961	0.002562
9_H1	0.002920	0.003486	0.003617	0.003898	0.003953	0.003518	0.002755	0.001947	0.003953
9_H2	0.003132	0.003586	0.004149	0.004507	0.004611	0.004301	0.003561	0.002593	0.004611
10_H1	0.001958	0.002398	0.002590	0.002721	0.002712	0.002521	0.002034	0.001453	0.002721
10_H2	0.002677	0.003682	0.004454	0.005186	0.005459	0.004909	0.003785	0.002766	0.005459
11_H1	0.003955	0.003305	0.003411	0.003603	0.003528	0.003183	0.002598	0.001925	0.003955
11_H2	0.002167	0.002644	0.002658	0.002825	0.002855	0.002687	0.002301	0.001709	0.002855

Min	0.001958	0.001944	0.001966	0.001817	0.001931	0.001624	0.001183	0.000947	0.002006
Max	0.003955	0.003694	0.004454	0.005186	0.005459	0.004909	0.003785	0.002766	0.005459
Mean	0.002775	0.002882	0.002900	0.003106	0.003173	0.002791	0.002106	0.001581	0.003350
σ	0.000608	0.000513	0.000772	0.000870	0.000865	0.000820	0.000752	0.000524	0.000852
Mean- σ	0.002167	0.002369	0.002128	0.002236	0.002308	0.001971	0.001354	0.001057	0.002498
Mean+ σ	0.003383	0.003396	0.003672	0.003976	0.004037	0.003611	0.002858	0.002105	0.004202
Q1	0.002263	0.002468	0.002346	0.002495	0.002629	0.002300	0.001441	0.001168	0.002732
Median	0.002655	0.002851	0.002641	0.002812	0.002875	0.002592	0.001993	0.001487	0.003356
Q3	0.003287	0.003289	0.003566	0.003739	0.003623	0.003232	0.002622	0.001926	0.003911

Table A.24 IDR results (Bldg: T3 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.003328	0.003104	0.003137	0.003419	0.003437	0.002887	0.002001	0.001234	0.003437
1_H2	0.002419	0.003297	0.003718	0.003864	0.003724	0.003282	0.002580	0.001762	0.003864
2_H1	0.002013	0.002593	0.002987	0.002943	0.002666	0.002285	0.001830	0.001291	0.002987
2_H2	0.003652	0.003187	0.002612	0.003065	0.003303	0.002595	0.001624	0.001338	0.003652
3_H1	0.001982	0.001967	0.002015	0.001973	0.001881	0.001587	0.001211	0.000909	0.002015
3_H2	0.003737	0.002762	0.002260	0.002491	0.002982	0.002339	0.001440	0.001297	0.003737
4_H1	0.002794	0.004085	0.004563	0.004728	0.004550	0.003949	0.003002	0.002000	0.004728
4_H2	0.002826	0.003509	0.004304	0.004498	0.004224	0.003678	0.002981	0.002094	0.004498
5_H1	0.002817	0.002639	0.002605	0.002684	0.002839	0.002247	0.001786	0.001233	0.002839
5_H2	0.002904	0.002459	0.002986	0.003047	0.002858	0.002538	0.002067	0.001447	0.003047
6_H1	0.003398	0.002567	0.001967	0.002251	0.002622	0.002003	0.001049	0.000932	0.003398
6_H2	0.002137	0.002110	0.001894	0.002004	0.002053	0.001640	0.001248	0.000859	0.002137
7_H1	0.003323	0.002713	0.002176	0.002502	0.002729	0.002197	0.001430	0.001054	0.003323
7_H2	0.002345	0.002530	0.002424	0.002491	0.002524	0.002078	0.001400	0.001002	0.002530
8_H1	0.002446	0.002257	0.002082	0.002186	0.002322	0.001876	0.001231	0.000926	0.002446
8_H2	0.002370	0.002412	0.002664	0.002622	0.002619	0.002182	0.001840	0.001363	0.002664
9_H1	0.003112	0.003524	0.003988	0.004104	0.004119	0.003788	0.003038	0.002083	0.004119
9_H2	0.002784	0.003220	0.003275	0.003496	0.003525	0.003136	0.002407	0.001601	0.003525
10_H1	0.002619	0.003660	0.004451	0.004941	0.005181	0.004566	0.003359	0.002321	0.005181
10_H2	0.001960	0.002515	0.003062	0.002985	0.002908	0.002623	0.002023	0.001417	0.003062
11_H1	0.002160	0.002830	0.002989	0.003104	0.003060	0.002650	0.001996	0.001403	0.003104
11_H2	0.003976	0.003130	0.003290	0.003558	0.003507	0.003110	0.002452	0.001659	0.003976

Min	0.001960	0.001967	0.001894	0.001973	0.001881	0.001587	0.001049	0.000859	0.002015
Max	0.003976	0.004085	0.004563	0.004941	0.005181	0.004566	0.003359	0.002321	0.005181
Mean	0.002777	0.002867	0.002975	0.003134	0.003165	0.002693	0.002000	0.001419	0.003376
σ	0.000599	0.000540	0.000816	0.000862	0.000817	0.000784	0.000674	0.000421	0.000814
Mean- σ	0.002178	0.002327	0.002159	0.002273	0.002348	0.001909	0.001326	0.000998	0.002562
Mean+ σ	0.003376	0.003406	0.003791	0.003996	0.003982	0.003476	0.002673	0.001841	0.004190
Q1	0.002351	0.002519	0.002301	0.002494	0.002633	0.002186	0.001433	0.001099	0.002876
Median	0.002789	0.002738	0.002987	0.003016	0.002945	0.002567	0.001918	0.001351	0.003361
Q3	0.003270	0.003212	0.003286	0.003543	0.003521	0.003130	0.002441	0.001645	0.003832

Table A.25 IDR results (Bldg: T4 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001987	0.002385	0.002389	0.002446	0.002397	0.002094	0.001605	0.001133	0.002446
1_H2	0.001567	0.002160	0.002264	0.002238	0.002095	0.001815	0.001571	0.001193	0.002264
2_H1	0.001139	0.001632	0.001733	0.001631	0.001496	0.001375	0.001210	0.000940	0.001733
2_H2	0.001874	0.002194	0.002058	0.002058	0.002002	0.001757	0.001372	0.000974	0.002194
3_H1	0.001560	0.002318	0.002561	0.002595	0.002479	0.002218	0.001825	0.001361	0.002595
3_H2	0.001817	0.002234	0.002184	0.002193	0.002136	0.001919	0.001542	0.001123	0.002234
4_H1	0.001491	0.002074	0.002321	0.002289	0.002138	0.001918	0.001604	0.001213	0.002321
4_H2	0.001485	0.001905	0.002219	0.002158	0.001953	0.001738	0.001493	0.001161	0.002219
5_H1	0.001669	0.001802	0.001813	0.001826	0.001905	0.001677	0.001276	0.000929	0.001905
5_H2	0.000748	0.001072	0.001118	0.001102	0.001023	0.000891	0.000720	0.000538	0.001118
6_H1	0.001553	0.002003	0.002056	0.002093	0.002040	0.001875	0.001580	0.001190	0.002093
6_H2	0.001880	0.002863	0.003264	0.003346	0.003234	0.002981	0.002549	0.001928	0.003346
7_H1	0.001546	0.002062	0.002172	0.002265	0.002345	0.002069	0.001788	0.001386	0.002345
7_H2	0.001802	0.002432	0.002665	0.002789	0.002739	0.002559	0.002205	0.001676	0.002789
8_H1	0.001828	0.002358	0.002750	0.003255	0.003395	0.003153	0.002621	0.001905	0.003395
8_H2	0.002329	0.003474	0.003911	0.004054	0.003960	0.003659	0.003107	0.002328	0.004054
9_H1	0.001927	0.002757	0.003007	0.003068	0.002934	0.002576	0.002051	0.001492	0.003068
9_H2	0.001297	0.001897	0.002073	0.002020	0.001861	0.001638	0.001343	0.001005	0.002073
10_H1	0.001859	0.001907	0.002308	0.002172	0.002041	0.001761	0.001444	0.001169	0.002308
10_H2	0.001377	0.001749	0.001759	0.001651	0.001540	0.001330	0.001047	0.000803	0.001759
11_H1	0.001967	0.002269	0.002215	0.002300	0.002300	0.002037	0.001578	0.001115	0.002300
11_H2	0.001535	0.001998	0.002062	0.002082	0.002028	0.001807	0.001437	0.001036	0.002082

Min	0.000748	0.001072	0.001118	0.001102	0.001023	0.000891	0.000720	0.000538	0.001118
Max	0.002329	0.003474	0.003911	0.004054	0.003960	0.003659	0.003107	0.002328	0.004054
Mean	0.001647	0.002161	0.002314	0.002347	0.002275	0.002039	0.001680	0.001254	0.002393
σ	0.000335	0.000479	0.000575	0.000647	0.000661	0.000629	0.000546	0.000407	0.000634
Mean- σ	0.001312	0.001683	0.001738	0.001700	0.001614	0.001410	0.001135	0.000847	0.001758
Mean+ σ	0.001982	0.002640	0.002889	0.002993	0.002935	0.002667	0.002226	0.001662	0.003027
Q1	0.001502	0.001906	0.002059	0.002064	0.001965	0.001743	0.001388	0.001013	0.002085
Median	0.001618	0.002117	0.002217	0.002216	0.002116	0.001897	0.001575	0.001165	0.002282
Q3	0.001870	0.002348	0.002518	0.002558	0.002459	0.002187	0.001816	0.001380	0.002558

Table A.26 IDR results (Bldg: T4 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001485	0.002089	0.002178	0.002117	0.001928	0.001733	0.001446	0.001029	0.002178
1_H2	0.001789	0.001942	0.002070	0.001980	0.001892	0.001614	0.001238	0.000955	0.002070
2_H1	0.001727	0.001955	0.001832	0.001876	0.001840	0.001574	0.001146	0.000789	0.001955
2_H2	0.001160	0.001454	0.001577	0.001446	0.001403	0.001207	0.001022	0.000749	0.001577
3_H1	0.001678	0.002069	0.002178	0.002159	0.002099	0.001821	0.001373	0.000929	0.002178
3_H2	0.001345	0.001952	0.002133	0.002149	0.002038	0.001781	0.001382	0.000938	0.002149
4_H1	0.001399	0.001859	0.002123	0.002039	0.001894	0.001652	0.001308	0.000942	0.002123
4_H2	0.001420	0.001777	0.001952	0.001888	0.001744	0.001531	0.001216	0.000849	0.001952
5_H1	0.000693	0.001027	0.001097	0.001061	0.000958	0.000800	0.000612	0.000419	0.001097
5_H2	0.001616	0.001661	0.001705	0.001725	0.001709	0.001401	0.001030	0.000673	0.001725
6_H1	0.001888	0.002537	0.003006	0.003068	0.002925	0.002678	0.002248	0.001604	0.003068
6_H2	0.001419	0.001984	0.002288	0.002375	0.002288	0.002026	0.001598	0.001125	0.002375
7_H1	0.001628	0.002179	0.002562	0.002675	0.002613	0.002424	0.002024	0.001422	0.002675
7_H2	0.001484	0.001969	0.002117	0.002195	0.002233	0.001894	0.001679	0.001223	0.002233
8_H1	0.002114	0.002746	0.003065	0.003172	0.003094	0.002832	0.002329	0.001630	0.003172
8_H2	0.001627	0.002309	0.003020	0.003484	0.003528	0.003164	0.002519	0.001752	0.003528
9_H1	0.001339	0.001899	0.002086	0.002012	0.001826	0.001573	0.001237	0.000851	0.002086
9_H2	0.001624	0.002174	0.002301	0.002331	0.002214	0.001895	0.001431	0.000962	0.002331
10_H1	0.001287	0.001568	0.001556	0.001568	0.001576	0.001325	0.000923	0.000635	0.001576
10_H2	0.001846	0.001885	0.001866	0.001905	0.001964	0.001607	0.001041	0.000728	0.001964
11_H1	0.001445	0.001924	0.002007	0.002017	0.001911	0.001621	0.001198	0.000788	0.002017
11_H2	0.001800	0.001997	0.001992	0.002017	0.001995	0.001687	0.001203	0.000887	0.002017

Min	0.000693	0.001027	0.001097	0.001061	0.000958	0.000800	0.000612	0.000419	0.001097
Max	0.002114	0.002746	0.003065	0.003484	0.003528	0.003164	0.002519	0.001752	0.003528
Mean	0.001537	0.001953	0.002123	0.002148	0.002076	0.001811	0.001418	0.000995	0.002184
σ	0.000295	0.000353	0.000478	0.000558	0.000565	0.000544	0.000480	0.000341	0.000545
Mean- σ	0.001242	0.001599	0.001646	0.001591	0.001511	0.001267	0.000939	0.000653	0.001639
Mean+ σ	0.001832	0.002306	0.002601	0.002706	0.002641	0.002355	0.001898	0.001336	0.002729
Q1	0.001404	0.001866	0.001888	0.001892	0.001830	0.001573	0.001159	0.000788	0.001957
Median	0.001551	0.001954	0.002102	0.002028	0.001946	0.001670	0.001273	0.000934	0.002105
Q3	0.001715	0.002084	0.002261	0.002297	0.002228	0.001895	0.001560	0.001101	0.002307

Table A.27 IDR results (Bldg: T4 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001958	0.002542	0.002636	0.002599	0.002431	0.002088	0.001787	0.001386	0.002636
1_H2	0.002279	0.002646	0.002725	0.002753	0.002730	0.002513	0.002026	0.001445	0.002753
2_H1	0.002269	0.003161	0.003361	0.003375	0.003168	0.002839	0.002289	0.001590	0.003375
2_H2	0.003424	0.003278	0.003105	0.003233	0.003570	0.003066	0.002002	0.001399	0.003570
3_H1	0.001765	0.002525	0.002829	0.002974	0.003007	0.002806	0.002360	0.001751	0.003007
3_H2	0.002639	0.003457	0.003837	0.004080	0.004035	0.003585	0.002823	0.001999	0.004080
4_H1	0.002312	0.002752	0.003138	0.003175	0.002972	0.002593	0.002087	0.001540	0.003175
4_H2	0.002562	0.002424	0.002479	0.002439	0.002672	0.002300	0.001813	0.001527	0.002672
5_H1	0.002682	0.002884	0.002669	0.002864	0.002968	0.002572	0.001829	0.001288	0.002968
5_H2	0.001895	0.002253	0.002193	0.002195	0.002094	0.001801	0.001379	0.001083	0.002253
6_H1	0.002033	0.002548	0.002625	0.002758	0.002757	0.002452	0.002005	0.001477	0.002758
6_H2	0.002140	0.002925	0.003269	0.003334	0.003167	0.002780	0.002227	0.001628	0.003334
7_H1	0.001708	0.002125	0.002349	0.002339	0.002195	0.001938	0.001582	0.001177	0.002349
7_H2	0.002021	0.002266	0.002284	0.002342	0.002281	0.002044	0.001651	0.001206	0.002342
8_H1	0.002251	0.002309	0.002575	0.002432	0.002124	0.001902	0.001646	0.001297	0.002575
8_H2	0.002345	0.003204	0.003477	0.003649	0.003596	0.003207	0.002552	0.001841	0.003649
9_H1	0.002679	0.003469	0.003601	0.003713	0.003672	0.003324	0.002646	0.001885	0.003713
9_H2	0.003094	0.003842	0.004158	0.004533	0.004604	0.004102	0.003260	0.002504	0.004604
10_H1	0.003270	0.003809	0.003828	0.003978	0.004096	0.003866	0.003347	0.002422	0.004096
10_H2	0.003339	0.004190	0.004834	0.005132	0.005078	0.004672	0.003928	0.002930	0.005132
11_H1	0.002518	0.002822	0.002700	0.002993	0.003093	0.002661	0.002426	0.001925	0.003093
11_H2	0.002833	0.002828	0.002659	0.002692	0.002719	0.002364	0.001951	0.001457	0.002833

Min	0.001708	0.002125	0.002193	0.002195	0.002094	0.001801	0.001379	0.001083	0.002253
Max	0.003424	0.004190	0.004834	0.005132	0.005078	0.004672	0.003928	0.002930	0.005132
Mean	0.002455	0.002921	0.003061	0.003163	0.003138	0.002794	0.002255	0.001671	0.003226
σ	0.000502	0.000569	0.000675	0.000764	0.000797	0.000751	0.000635	0.000464	0.000753
Mean- σ	0.001954	0.002352	0.002386	0.002399	0.002341	0.002043	0.001621	0.001207	0.002473
Mean+ σ	0.002957	0.003490	0.003735	0.003927	0.003935	0.003545	0.002890	0.002135	0.003978
Q1	0.002060	0.002529	0.002628	0.002622	0.002684	0.002316	0.001817	0.001389	0.002692
Median	0.002329	0.002825	0.002777	0.002984	0.002990	0.002627	0.002057	0.001534	0.003050
Q3	0.002681	0.003260	0.003448	0.003581	0.003590	0.003172	0.002521	0.001874	0.003629

Table A.28 IDR results (Bldg: T4 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002116	0.002409	0.002681	0.002653	0.002549	0.002149	0.001750	0.001323	0.002681
1_H2	0.001852	0.002303	0.002695	0.002561	0.002239	0.001982	0.001628	0.001147	0.002695
2_H1	0.003344	0.003125	0.003045	0.003182	0.003435	0.002758	0.001824	0.001190	0.003435
2_H2	0.002017	0.002519	0.002603	0.002763	0.002934	0.002575	0.001850	0.001146	0.002934
3_H1	0.002349	0.002918	0.003218	0.003389	0.003320	0.002879	0.002189	0.001494	0.003389
3_H2	0.001701	0.002356	0.002523	0.002709	0.002707	0.002489	0.002032	0.001407	0.002709
4_H1	0.002552	0.002392	0.002210	0.002525	0.002723	0.002215	0.001383	0.001047	0.002723
4_H2	0.002089	0.002294	0.002431	0.002549	0.002459	0.002081	0.001522	0.000986	0.002549
5_H1	0.001805	0.002162	0.002150	0.002268	0.002250	0.001920	0.001381	0.000872	0.002268
5_H2	0.002263	0.002405	0.002305	0.002487	0.002503	0.002073	0.001383	0.000926	0.002503
6_H1	0.002104	0.002743	0.002868	0.003004	0.002971	0.002565	0.001865	0.001181	0.003004
6_H2	0.001997	0.002650	0.002798	0.002931	0.002855	0.002424	0.001761	0.001135	0.002931
7_H1	0.001854	0.002049	0.002034	0.002063	0.001974	0.001691	0.001265	0.000874	0.002063
7_H2	0.001495	0.001740	0.001885	0.001825	0.001689	0.001526	0.001287	0.000929	0.001885
8_H1	0.002103	0.002518	0.002709	0.002857	0.002791	0.002438	0.001844	0.001222	0.002857
8_H2	0.002130	0.002252	0.002542	0.002454	0.002225	0.001989	0.001673	0.001205	0.002542
9_H1	0.002637	0.003550	0.003859	0.004162	0.004121	0.003514	0.002549	0.001638	0.004162
9_H2	0.002583	0.003624	0.003979	0.004117	0.003864	0.003189	0.002310	0.001510	0.004117
10_H1	0.003061	0.003503	0.004000	0.004202	0.004116	0.003755	0.003059	0.002119	0.004202
10_H2	0.002821	0.003258	0.003503	0.003703	0.003798	0.003300	0.002745	0.001990	0.003798
11_H1	0.002513	0.002266	0.002268	0.002249	0.002333	0.001901	0.001483	0.001033	0.002513
11_H2	0.002271	0.002479	0.002554	0.002720	0.002768	0.002363	0.001759	0.001327	0.002768

Min	0.001495	0.001740	0.001885	0.001825	0.001689	0.001526	0.001265	0.000872	0.001885
Max	0.003344	0.003624	0.004000	0.004202	0.004121	0.003755	0.003059	0.002119	0.004202
Mean	0.002257	0.002614	0.002766	0.002881	0.002847	0.002444	0.001843	0.001259	0.002942
σ	0.000448	0.000509	0.000609	0.000666	0.000678	0.000589	0.000477	0.000332	0.000652
Mean-σ	0.001809	0.002105	0.002157	0.002215	0.002169	0.001855	0.001366	0.000927	0.002290
Mean+σ	0.002705	0.003124	0.003376	0.003547	0.003524	0.003033	0.002320	0.001591	0.003595
Q1	0.002002	0.002296	0.002337	0.002497	0.002365	0.002010	0.001493	0.001037	0.002544
Median	0.002123	0.002444	0.002642	0.002715	0.002746	0.002394	0.001760	0.001186	0.002746
Q3	0.002542	0.002874	0.003001	0.003138	0.003233	0.002712	0.001990	0.001387	0.003293

Table A.29 IDR results (Bldg: T4 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002649	0.003640	0.004064	0.004173	0.004019	0.003598	0.002939	0.002163	0.004173
1_H2	0.003501	0.003371	0.003315	0.003530	0.003573	0.003113	0.002303	0.001557	0.003573
2_H1	0.003859	0.003660	0.003156	0.003414	0.003713	0.003168	0.002173	0.001837	0.003859
2_H2	0.002178	0.002499	0.002776	0.002708	0.002526	0.002283	0.001780	0.001292	0.002776
3_H1	0.003969	0.003288	0.002722	0.002884	0.003393	0.002931	0.001808	0.001519	0.003969
3_H2	0.002055	0.002032	0.002279	0.002144	0.002036	0.001752	0.001415	0.001175	0.002279
4_H1	0.002916	0.003689	0.004354	0.004546	0.004394	0.003971	0.003308	0.002482	0.004546
4_H2	0.002979	0.004105	0.004464	0.004770	0.004866	0.004426	0.003517	0.002492	0.004866
5_H1	0.003023	0.002932	0.003482	0.003499	0.003280	0.002964	0.002516	0.001908	0.003499
5_H2	0.002995	0.002916	0.002681	0.002832	0.002871	0.002669	0.002218	0.001635	0.002995
6_H1	0.002431	0.002624	0.002366	0.002464	0.002498	0.002138	0.001518	0.001137	0.002624
6_H2	0.003603	0.003072	0.002290	0.002672	0.003067	0.002622	0.001603	0.001173	0.003603
7_H1	0.002351	0.002551	0.002322	0.002450	0.002525	0.002181	0.001540	0.001023	0.002551
7_H2	0.003427	0.003243	0.002672	0.002892	0.003081	0.002603	0.001673	0.001295	0.003427
8_H1	0.002420	0.002846	0.003036	0.003164	0.003203	0.002848	0.002327	0.001820	0.003203
8_H2	0.002776	0.002782	0.002420	0.002646	0.002812	0.002426	0.001660	0.001156	0.002812
9_H1	0.003435	0.004270	0.004479	0.004809	0.004876	0.004399	0.003512	0.002514	0.004876
9_H2	0.003361	0.004188	0.004925	0.005383	0.005497	0.005149	0.004319	0.003183	0.005497
10_H1	0.002163	0.002720	0.002953	0.003170	0.003298	0.003116	0.002584	0.001879	0.003298
10_H2	0.002932	0.004100	0.004710	0.005502	0.005806	0.005348	0.004271	0.003066	0.005806
11_H1	0.004108	0.003693	0.003781	0.003850	0.003954	0.003621	0.002900	0.002222	0.004108
11_H2	0.002413	0.002955	0.003109	0.003286	0.003396	0.003274	0.002823	0.002112	0.003396

Min	0.002055	0.002032	0.002279	0.002144	0.002036	0.001752	0.001415	0.001023	0.002279
Max	0.004108	0.004270	0.004925	0.005502	0.005806	0.005348	0.004319	0.003183	0.005806
Mean	0.002979	0.003235	0.003289	0.003490	0.003577	0.003209	0.002487	0.001847	0.003715
σ	0.000613	0.000618	0.000863	0.000978	0.000994	0.000957	0.000876	0.000627	0.000948
Mean- σ	0.002366	0.002617	0.002426	0.002513	0.002583	0.002252	0.001610	0.001220	0.002767
Mean+ σ	0.003592	0.003853	0.004152	0.004468	0.004570	0.004166	0.003363	0.002475	0.004664
Q1	0.002423	0.002798	0.002674	0.002739	0.002920	0.002608	0.001700	0.001293	0.003047
Median	0.002956	0.003158	0.003073	0.003228	0.003346	0.003039	0.002315	0.001829	0.003536
Q3	0.003433	0.003682	0.003993	0.004092	0.004003	0.003615	0.002929	0.002207	0.004157

Table A.30 IDR results (Bldg: T4 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.003310	0.003113	0.003160	0.003451	0.003472	0.002919	0.002022	0.001240	0.003472
1_H2	0.002391	0.003273	0.003696	0.003844	0.003703	0.003256	0.002549	0.001731	0.003844
2_H1	0.001982	0.002712	0.003132	0.003080	0.002784	0.002381	0.001900	0.001337	0.003132
2_H2	0.003615	0.003153	0.002586	0.003052	0.003298	0.002588	0.001583	0.001227	0.003615
3_H1	0.002003	0.002028	0.001974	0.002019	0.001970	0.001614	0.001177	0.000902	0.002028
3_H2	0.003681	0.002712	0.002210	0.002438	0.002906	0.002287	0.001411	0.001280	0.003681
4_H1	0.002759	0.003964	0.004417	0.004613	0.004463	0.003879	0.002938	0.002042	0.004613
4_H2	0.002713	0.003462	0.004207	0.004411	0.004160	0.003614	0.002895	0.002026	0.004411
5_H1	0.002821	0.002652	0.002573	0.002686	0.002837	0.002227	0.001749	0.001199	0.002837
5_H2	0.002899	0.002418	0.002876	0.002918	0.002721	0.002404	0.001951	0.001375	0.002918
6_H1	0.003357	0.002570	0.002020	0.002297	0.002625	0.002024	0.001102	0.000893	0.003357
6_H2	0.002088	0.002071	0.001872	0.001972	0.002009	0.001617	0.001217	0.000831	0.002088
7_H1	0.003322	0.002595	0.002140	0.002415	0.002766	0.002146	0.001432	0.001013	0.003322
7_H2	0.002330	0.002503	0.002454	0.002489	0.002531	0.002078	0.001388	0.000986	0.002531
8_H1	0.002394	0.002159	0.002079	0.002081	0.002233	0.001800	0.001222	0.000922	0.002394
8_H2	0.002407	0.002473	0.002608	0.002537	0.002629	0.002164	0.001790	0.001329	0.002629
9_H1	0.003052	0.003643	0.004143	0.004223	0.004005	0.003521	0.002776	0.001891	0.004223
9_H2	0.002671	0.003059	0.003114	0.003332	0.003368	0.003005	0.002314	0.001577	0.003368
10_H1	0.002553	0.003541	0.004564	0.004911	0.005141	0.004520	0.003343	0.002318	0.005141
10_H2	0.001996	0.002805	0.003463	0.003412	0.003146	0.002808	0.002260	0.001609	0.003463
11_H1	0.002216	0.002937	0.003128	0.003245	0.003177	0.002752	0.002034	0.001394	0.003245
11_H2	0.003929	0.003186	0.003367	0.003630	0.003596	0.003194	0.002487	0.001675	0.003929

Min	0.001982	0.002028	0.001872	0.001972	0.001970	0.001614	0.001102	0.000831	0.002028
Max	0.003929	0.003964	0.004564	0.004911	0.005141	0.004520	0.003343	0.002318	0.005141
Mean	0.002750	0.002865	0.002990	0.003139	0.003161	0.002673	0.001979	0.001400	0.003375
σ	0.000584	0.000519	0.000829	0.000861	0.000793	0.000759	0.000648	0.000417	0.000799
Mean- σ	0.002165	0.002346	0.002161	0.002278	0.002368	0.001914	0.001331	0.000983	0.002575
Mean+ σ	0.003334	0.003384	0.003819	0.004000	0.003954	0.003432	0.002627	0.001817	0.004174
Q1	0.002345	0.002520	0.002271	0.002451	0.002652	0.002151	0.001416	0.001060	0.002857
Median	0.002692	0.002759	0.002995	0.003066	0.003026	0.002496	0.001926	0.001333	0.003363
Q3	0.003246	0.003178	0.003439	0.003585	0.003565	0.003147	0.002444	0.001659	0.003803

Table A.31 IDR results (Bldg: U1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001111	0.001765	0.001883	0.001806	0.001638	0.001438	0.001155	0.000783	0.001883
1_H2	0.001022	0.001699	0.001916	0.001985	0.001975	0.001805	0.001446	0.000957	0.001985
2_H1	0.000764	0.001232	0.001244	0.001151	0.001049	0.000913	0.000759	0.000528	0.001244
2_H2	0.001100	0.001694	0.001733	0.001560	0.001365	0.001207	0.000969	0.000657	0.001733
3_H1	0.001105	0.001861	0.002066	0.001988	0.001805	0.001562	0.001230	0.000819	0.002066
3_H2	0.001087	0.001717	0.001856	0.001725	0.001573	0.001383	0.001106	0.000748	0.001856
4_H1	0.000938	0.001441	0.001505	0.001422	0.001279	0.001124	0.000914	0.000626	0.001505
4_H2	0.000938	0.001500	0.001604	0.001495	0.001323	0.001143	0.000916	0.000610	0.001604
5_H1	0.001125	0.001741	0.001802	0.001651	0.001427	0.001177	0.000923	0.000616	0.001802
5_H2	0.000644	0.001018	0.001026	0.000871	0.000730	0.000604	0.000469	0.000329	0.001026
6_H1	0.000966	0.001646	0.001843	0.001790	0.001661	0.001488	0.001212	0.000821	0.001843
6_H2	0.001318	0.002095	0.002200	0.002159	0.002142	0.002005	0.001656	0.001118	0.002200
7_H1	0.000998	0.001593	0.001793	0.001813	0.001658	0.001528	0.001250	0.000818	0.001813
7_H2	0.001233	0.002023	0.002304	0.002386	0.002301	0.002071	0.001659	0.001097	0.002386
8_H1	0.001156	0.002025	0.002493	0.002713	0.002621	0.002518	0.002025	0.001293	0.002713
8_H2	0.001438	0.002297	0.002501	0.002560	0.002520	0.002357	0.001946	0.001305	0.002560
9_H1	0.001125	0.001844	0.002027	0.001937	0.001737	0.001490	0.001173	0.000779	0.002027
9_H2	0.000889	0.001438	0.001514	0.001373	0.001181	0.000978	0.000755	0.000511	0.001514
10_H1	0.001213	0.001843	0.001887	0.001703	0.001458	0.001207	0.000942	0.000640	0.001887
10_H2	0.000881	0.001373	0.001406	0.001258	0.001074	0.000884	0.000688	0.000463	0.001406
11_H1	0.001092	0.001706	0.001795	0.001674	0.001503	0.001302	0.001040	0.000698	0.001795
11_H2	0.000929	0.001473	0.001562	0.001441	0.001270	0.001092	0.000875	0.000592	0.001562

Min	0.000644	0.001018	0.001026	0.000871	0.000730	0.000604	0.000469	0.000329	0.001026
Max	0.001438	0.002297	0.002501	0.002713	0.002621	0.002518	0.002025	0.001305	0.002713
Mean	0.001049	0.001683	0.001816	0.001748	0.001604	0.001422	0.001141	0.000764	0.001837
σ	0.000178	0.000295	0.000369	0.000444	0.000478	0.000482	0.000399	0.000256	0.000402
Mean- σ	0.000870	0.001388	0.001447	0.001304	0.001126	0.000939	0.000743	0.000508	0.001435
Mean+ σ	0.001227	0.001977	0.002186	0.002193	0.002082	0.001904	0.001540	0.001020	0.002239
Q1	0.000938	0.001480	0.001573	0.001455	0.001290	0.001129	0.000915	0.000612	0.001573
Median	0.001090	0.001703	0.001823	0.001714	0.001538	0.001343	0.001073	0.000723	0.001828
Q3	0.001125	0.001844	0.001999	0.001973	0.001788	0.001554	0.001245	0.000821	0.002017

Table A.32 IDR results (Bldg: U1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001218	0.001965	0.002138	0.002015	0.001756	0.001595	0.001332	0.000946	0.002138
1_H2	0.001353	0.002109	0.002248	0.002117	0.001883	0.001608	0.001278	0.000889	0.002248
2_H1	0.001290	0.001975	0.002038	0.001860	0.001629	0.001428	0.001184	0.000843	0.002038
2_H2	0.000902	0.001463	0.001514	0.001395	0.001274	0.001181	0.001015	0.000730	0.001514
3_H1	0.001278	0.002000	0.002126	0.001997	0.001841	0.001641	0.001349	0.000956	0.002126
3_H2	0.001257	0.002067	0.002299	0.002245	0.002069	0.001821	0.001481	0.001046	0.002299
4_H1	0.001097	0.001727	0.001908	0.001854	0.001690	0.001477	0.001193	0.000847	0.001908
4_H2	0.001087	0.001762	0.001960	0.001901	0.001738	0.001536	0.001260	0.000895	0.001960
5_H1	0.000780	0.001245	0.001307	0.001182	0.001013	0.000846	0.000665	0.000465	0.001307
5_H2	0.001152	0.001758	0.001845	0.001739	0.001550	0.001319	0.001077	0.000763	0.001845
6_H1	0.001414	0.002371	0.002738	0.002795	0.002701	0.002513	0.002117	0.001483	0.002795
6_H2	0.001175	0.001880	0.002099	0.002096	0.001975	0.001762	0.001428	0.000992	0.002099
7_H1	0.001387	0.002244	0.002491	0.002500	0.002463	0.002264	0.001860	0.001293	0.002500
7_H2	0.001155	0.001859	0.002034	0.002072	0.001967	0.001741	0.001450	0.000986	0.002072
8_H1	0.001696	0.002793	0.003170	0.003214	0.003108	0.002873	0.002401	0.001671	0.003214
8_H2	0.001390	0.002191	0.002699	0.003121	0.003180	0.002821	0.002184	0.001450	0.003180
9_H1	0.001046	0.001717	0.001895	0.001817	0.001658	0.001454	0.001182	0.000837	0.001895
9_H2	0.001513	0.002455	0.002735	0.002674	0.002441	0.002113	0.001684	0.001168	0.002735
10_H1	0.001049	0.001640	0.001716	0.001566	0.001364	0.001170	0.000948	0.000681	0.001716
10_H2	0.001311	0.001980	0.002071	0.001943	0.001716	0.001431	0.001116	0.000792	0.002071
11_H1	0.001125	0.001790	0.001936	0.001833	0.001637	0.001416	0.001146	0.000810	0.001936
11_H2	0.001313	0.002034	0.002168	0.002052	0.001847	0.001608	0.001302	0.000917	0.002168

Min	0.000780	0.001245	0.001307	0.001182	0.001013	0.000846	0.000665	0.000465	0.001307
Max	0.001696	0.002793	0.003170	0.003214	0.003180	0.002873	0.002401	0.001671	0.003214
Mean	0.001227	0.001956	0.002143	0.002090	0.001932	0.001710	0.001393	0.000975	0.002171
σ	0.000202	0.000337	0.000426	0.000506	0.000547	0.000517	0.000423	0.000284	0.000474
Mean- σ	0.001025	0.001619	0.001716	0.001584	0.001385	0.001193	0.000970	0.000691	0.001697
Mean+ σ	0.001429	0.002292	0.002569	0.002597	0.002479	0.002227	0.001817	0.001260	0.002645
Q1	0.001104	0.001759	0.001915	0.001838	0.001642	0.001429	0.001155	0.000817	0.001915
Median	0.001238	0.001970	0.002085	0.002006	0.001799	0.001602	0.001290	0.000906	0.002086
Q3	0.001343	0.002099	0.002286	0.002213	0.002046	0.001806	0.001473	0.001033	0.002286

Table A.33 IDR results (Bldg: U1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001231	0.001993	0.002107	0.002057	0.001863	0.001586	0.001262	0.000850	0.002107
1_H2	0.001354	0.002048	0.002256	0.002164	0.001985	0.001707	0.001368	0.000912	0.002256
2_H1	0.001393	0.002270	0.002419	0.002257	0.002299	0.002046	0.001552	0.000973	0.002419
2_H2	0.002102	0.003172	0.003251	0.002950	0.002499	0.001997	0.001578	0.001057	0.003251
3_H1	0.001147	0.001958	0.002266	0.002412	0.002413	0.002192	0.001732	0.001120	0.002413
3_H2	0.001600	0.002627	0.002934	0.002867	0.002601	0.002296	0.001852	0.001221	0.002934
4_H1	0.001250	0.001978	0.002158	0.002037	0.001779	0.001457	0.001089	0.000708	0.002158
4_H2	0.001577	0.002388	0.002433	0.002201	0.001882	0.001532	0.001148	0.000755	0.002433
5_H1	0.001501	0.002356	0.002499	0.002329	0.002034	0.001678	0.001268	0.000826	0.002499
5_H2	0.001255	0.002008	0.002134	0.001974	0.001709	0.001429	0.001118	0.000753	0.002134
6_H1	0.001237	0.001964	0.002132	0.002030	0.001830	0.001590	0.001255	0.000826	0.002132
6_H2	0.001450	0.002379	0.002588	0.002445	0.002173	0.001869	0.001472	0.000967	0.002588
7_H1	0.001003	0.001521	0.001640	0.001550	0.001363	0.001139	0.000876	0.000583	0.001640
7_H2	0.001241	0.001939	0.002046	0.001895	0.001638	0.001351	0.001039	0.000695	0.002046
8_H1	0.001338	0.002003	0.001933	0.001719	0.001518	0.001323	0.001077	0.000737	0.002003
8_H2	0.001372	0.002235	0.002502	0.002492	0.002337	0.002061	0.001625	0.001073	0.002502
9_H1	0.001756	0.002886	0.003198	0.003090	0.002720	0.002242	0.001723	0.001133	0.003198
9_H2	0.001607	0.002605	0.002844	0.002738	0.002452	0.002062	0.001653	0.001112	0.002844
10_H1	0.001695	0.002688	0.002960	0.002971	0.002815	0.002495	0.001970	0.001336	0.002971
10_H2	0.001688	0.002654	0.002805	0.002678	0.002633	0.002466	0.002053	0.001380	0.002805
11_H1	0.001479	0.002281	0.002419	0.002359	0.002129	0.001764	0.001434	0.000980	0.002419
11_H2	0.001450	0.002156	0.002157	0.001988	0.001828	0.001660	0.001351	0.000899	0.002157

Min	0.001003	0.001521	0.001640	0.001550	0.001363	0.001139	0.000876	0.000583	0.001640
Max	0.002102	0.003172	0.003251	0.003090	0.002815	0.002495	0.002053	0.001380	0.003251
Mean	0.001442	0.002278	0.002440	0.002327	0.002114	0.001816	0.001432	0.000950	0.002450
σ	0.000243	0.000379	0.000417	0.000420	0.000410	0.000383	0.000319	0.000213	0.000412
Mean- σ	0.001199	0.001899	0.002023	0.001907	0.001704	0.001432	0.001113	0.000737	0.002039
Mean+ σ	0.001685	0.002657	0.002857	0.002748	0.002524	0.002199	0.001750	0.001162	0.002862
Q1	0.001251	0.001996	0.002140	0.002032	0.001829	0.001546	0.001175	0.000773	0.002140
Median	0.001422	0.002253	0.002419	0.002293	0.002082	0.001736	0.001401	0.000940	0.002419
Q3	0.001594	0.002551	0.002751	0.002632	0.002442	0.002062	0.001646	0.001102	0.002751

Table A.34 IDR results (Bldg: U1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001440	0.002222	0.002331	0.002178	0.001932	0.001713	0.001435	0.001025	0.002331
1_H2	0.001435	0.002279	0.002465	0.002330	0.002040	0.001741	0.001461	0.001037	0.002465
2_H1	0.002193	0.003301	0.003478	0.003292	0.002909	0.002402	0.001808	0.001211	0.003478
2_H2	0.001746	0.002803	0.003065	0.002920	0.002744	0.002526	0.001996	0.001313	0.003065
3_H1	0.001937	0.003203	0.003629	0.003597	0.003276	0.002780	0.002153	0.001473	0.003629
3_H2	0.001344	0.002202	0.002554	0.002671	0.002680	0.002454	0.001968	0.001324	0.002680
4_H1	0.001726	0.002598	0.002719	0.002542	0.002226	0.001838	0.001401	0.000955	0.002719
4_H2	0.001502	0.002404	0.002762	0.002760	0.002538	0.002176	0.001703	0.001173	0.002762
5_H1	0.001288	0.002005	0.002078	0.001893	0.001681	0.001468	0.001194	0.000843	0.002078
5_H2	0.001668	0.002541	0.002706	0.002560	0.002281	0.001932	0.001524	0.001061	0.002706
6_H1	0.001625	0.002616	0.002869	0.002811	0.002563	0.002196	0.001771	0.001241	0.002869
6_H2	0.001496	0.002380	0.002622	0.002566	0.002368	0.002078	0.001675	0.001173	0.002622
7_H1	0.001442	0.002212	0.002267	0.002172	0.002004	0.001758	0.001416	0.000993	0.002267
7_H2	0.001208	0.001866	0.002053	0.001981	0.001801	0.001570	0.001269	0.000895	0.002053
8_H1	0.001629	0.002647	0.002979	0.002974	0.002784	0.002457	0.001967	0.001358	0.002979
8_H2	0.001456	0.002146	0.002130	0.002017	0.001865	0.001711	0.001446	0.001035	0.002146
9_H1	0.002045	0.003313	0.003782	0.003839	0.003605	0.003129	0.002441	0.001693	0.003839
9_H2	0.001953	0.003163	0.003481	0.003340	0.002963	0.002535	0.002057	0.001446	0.003481
10_H1	0.002095	0.003309	0.003656	0.003773	0.003646	0.003309	0.002736	0.001908	0.003773
10_H2	0.002039	0.003194	0.003444	0.003359	0.003137	0.003012	0.002591	0.001791	0.003444
11_H1	0.001727	0.002563	0.002570	0.002344	0.002106	0.001879	0.001560	0.001104	0.002570
11_H2	0.001683	0.002599	0.002763	0.002680	0.002411	0.002235	0.001935	0.001386	0.002763

Min	0.001208	0.001866	0.002053	0.001893	0.001681	0.001468	0.001194	0.000843	0.002053
Max	0.002193	0.003313	0.003782	0.003839	0.003646	0.003309	0.002736	0.001908	0.003839
Mean	0.001667	0.002617	0.002837	0.002755	0.002525	0.002223	0.001796	0.001247	0.002851
σ	0.000278	0.000453	0.000539	0.000579	0.000566	0.000517	0.000420	0.000285	0.000550
Mean-σ	0.001389	0.002163	0.002297	0.002176	0.001959	0.001706	0.001376	0.000962	0.002301
Mean+σ	0.001946	0.003070	0.003376	0.003333	0.003092	0.002739	0.002216	0.001532	0.003400
Q1	0.001446	0.002236	0.002487	0.002334	0.002057	0.001778	0.001450	0.001036	0.002491
Median	0.001649	0.002581	0.002741	0.002676	0.002475	0.002186	0.001737	0.001192	0.002741
Q3	0.001889	0.003073	0.003349	0.003213	0.002878	0.002509	0.001989	0.001379	0.003349

Table A.35 IDR results (Bldg: U1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001552	0.002625	0.003054	0.003122	0.002966	0.002630	0.002083	0.001370	0.003122
1_H2	0.001914	0.002780	0.002747	0.002562	0.002336	0.002025	0.001599	0.001062	0.002780
2_H1	0.002084	0.003115	0.003143	0.002829	0.002402	0.001932	0.001422	0.000924	0.003143
2_H2	0.001194	0.001993	0.002225	0.002139	0.001894	0.001605	0.001253	0.000814	0.002225
3_H1	0.001946	0.002788	0.002744	0.002443	0.002070	0.001668	0.001240	0.000806	0.002788
3_H2	0.001284	0.001953	0.001977	0.001766	0.001502	0.001261	0.000988	0.000668	0.001977
4_H1	0.001543	0.002577	0.003091	0.003251	0.003150	0.002809	0.002208	0.001463	0.003251
4_H2	0.001857	0.003089	0.003563	0.003597	0.003336	0.002974	0.002474	0.001674	0.003597
5_H1	0.001746	0.002562	0.002506	0.002211	0.002028	0.001745	0.001374	0.000914	0.002562
5_H2	0.001661	0.002501	0.002528	0.002244	0.002120	0.001942	0.001586	0.001081	0.002528
6_H1	0.001327	0.002039	0.002095	0.001904	0.001644	0.001358	0.001070	0.000716	0.002095
6_H2	0.002098	0.003009	0.002949	0.002601	0.002170	0.001723	0.001263	0.000820	0.003009
7_H1	0.001428	0.002196	0.002250	0.002025	0.001711	0.001380	0.001076	0.000727	0.002250
7_H2	0.002022	0.002919	0.002865	0.002514	0.002085	0.001651	0.001212	0.000783	0.002919
8_H1	0.001441	0.002205	0.002265	0.002097	0.001863	0.001571	0.001238	0.000841	0.002265
8_H2	0.001455	0.002194	0.002234	0.002028	0.001752	0.001449	0.001101	0.000731	0.002234
9_H1	0.001463	0.002313	0.002580	0.002642	0.002562	0.002317	0.001863	0.001250	0.002642
9_H2	0.001681	0.002627	0.002966	0.002983	0.002935	0.002751	0.002274	0.001517	0.002983
10_H1	0.001360	0.002138	0.002321	0.002255	0.002092	0.001891	0.001522	0.001019	0.002321
10_H2	0.001872	0.003115	0.003868	0.004312	0.004269	0.003699	0.002781	0.001761	0.004312
11_H1	0.001944	0.002819	0.002992	0.003200	0.003152	0.002807	0.002175	0.001407	0.003200
11_H2	0.001321	0.002118	0.002296	0.002258	0.002095	0.001838	0.001447	0.000953	0.002296

Min	0.001194	0.001953	0.001977	0.001766	0.001502	0.001261	0.000988	0.000668	0.001977
Max	0.002098	0.003115	0.003868	0.004312	0.004269	0.003699	0.002781	0.001761	0.004312
Mean	0.001645	0.002531	0.002694	0.002590	0.002370	0.002047	0.001602	0.001059	0.002750
σ	0.000284	0.000389	0.000485	0.000618	0.000676	0.000639	0.000514	0.000334	0.000560
Mean- σ	0.001361	0.002142	0.002208	0.001972	0.001694	0.001408	0.001088	0.000725	0.002190
Mean+ σ	0.001930	0.002920	0.003179	0.003209	0.003046	0.002685	0.002116	0.001393	0.003310
Q1	0.001431	0.002195	0.002273	0.002157	0.001928	0.001617	0.001239	0.000808	0.002273
Median	0.001607	0.002570	0.002662	0.002479	0.002108	0.001865	0.001435	0.000939	0.002711
Q3	0.001904	0.002811	0.002986	0.002945	0.002842	0.002552	0.002028	0.001340	0.003094

Table A.36 IDR results (Bldg: U1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002063	0.002980	0.003027	0.002916	0.002641	0.002259	0.001784	0.001244	0.003027
1_H2	0.001915	0.003175	0.003649	0.003700	0.003495	0.003097	0.002491	0.001724	0.003700
2_H1	0.001395	0.002210	0.002482	0.002416	0.002180	0.001867	0.001480	0.001027	0.002482
2_H2	0.002342	0.003482	0.003543	0.003224	0.002762	0.002242	0.001689	0.001160	0.003543
3_H1	0.001353	0.002035	0.002109	0.001963	0.001726	0.001451	0.001129	0.000777	0.002109
3_H2	0.002235	0.003208	0.003197	0.002909	0.002526	0.002088	0.001604	0.001112	0.003208
4_H1	0.002302	0.003769	0.004225	0.004169	0.003827	0.003281	0.002558	0.001747	0.004225
4_H2	0.001893	0.003204	0.003698	0.003803	0.003707	0.003408	0.002806	0.001952	0.003803
5_H1	0.001926	0.002891	0.002941	0.002646	0.002520	0.002275	0.001858	0.001304	0.002941
5_H2	0.001953	0.002801	0.002892	0.002921	0.002785	0.002518	0.002049	0.001402	0.002921
6_H1	0.002377	0.003384	0.003311	0.002938	0.002475	0.002003	0.001528	0.001058	0.003384
6_H2	0.001572	0.002391	0.002447	0.002222	0.001906	0.001593	0.001321	0.000938	0.002447
7_H1	0.002151	0.003149	0.003199	0.002920	0.002518	0.002069	0.001577	0.001076	0.003199
7_H2	0.001687	0.002556	0.002648	0.002425	0.002086	0.001721	0.001331	0.000928	0.002648
8_H1	0.001734	0.002599	0.002696	0.002497	0.002185	0.001826	0.001418	0.000981	0.002696
8_H2	0.001615	0.002558	0.002790	0.002799	0.002714	0.002452	0.001987	0.001371	0.002799
9_H1	0.002005	0.003279	0.003848	0.004099	0.004077	0.003779	0.003134	0.002179	0.004099
9_H2	0.002048	0.003232	0.003571	0.003551	0.003343	0.002991	0.002441	0.001703	0.003571
10_H1	0.002160	0.003527	0.004076	0.004718	0.004767	0.004163	0.003120	0.002033	0.004767
10_H2	0.001531	0.002532	0.002792	0.002820	0.002667	0.002379	0.001993	0.001396	0.002820
11_H1	0.001715	0.002715	0.002989	0.002929	0.002691	0.002337	0.001952	0.001387	0.002989
11_H2	0.002288	0.003556	0.003852	0.003740	0.003440	0.002998	0.002384	0.001646	0.003852

Min	0.001353	0.002035	0.002109	0.001963	0.001726	0.001451	0.001129	0.000777	0.002109
Max	0.002377	0.003769	0.004225	0.004718	0.004767	0.004163	0.003134	0.002179	0.004767
Mean	0.001921	0.002965	0.003181	0.003106	0.002865	0.002491	0.001983	0.001370	0.003238
σ	0.000310	0.000470	0.000568	0.000695	0.000759	0.000720	0.000581	0.000391	0.000653
Mean- σ	0.001611	0.002495	0.002613	0.002410	0.002106	0.001771	0.001403	0.000979	0.002584
Mean+ σ	0.002231	0.003435	0.003749	0.003801	0.003624	0.003211	0.002564	0.001761	0.003891
Q1	0.001694	0.002568	0.002791	0.002684	0.002486	0.002020	0.001540	0.001063	0.002804
Median	0.001940	0.003065	0.003112	0.002921	0.002679	0.002306	0.001905	0.001338	0.003113
Q3	0.002158	0.003267	0.003630	0.003663	0.003416	0.002996	0.002427	0.001689	0.003668

Table A.37 IDR results (Bldg: U2 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001250	0.001950	0.002075	0.001961	0.001744	0.001473	0.001172	0.000832	0.002075
1_H2	0.001154	0.001833	0.001953	0.001933	0.001885	0.001741	0.001433	0.000999	0.001953
2_H1	0.000861	0.001366	0.001387	0.001269	0.001138	0.001030	0.000887	0.000645	0.001387
2_H2	0.001224	0.001863	0.001894	0.001723	0.001509	0.001308	0.001095	0.000789	0.001894
3_H1	0.001203	0.001981	0.002225	0.002182	0.002007	0.001755	0.001416	0.000992	0.002225
3_H2	0.001188	0.001829	0.001962	0.001858	0.001693	0.001496	0.001218	0.000862	0.001962
4_H1	0.001057	0.001609	0.001703	0.001638	0.001482	0.001304	0.001067	0.000758	0.001703
4_H2	0.001047	0.001634	0.001753	0.001717	0.001563	0.001351	0.001077	0.000768	0.001753
5_H1	0.001171	0.001783	0.001868	0.001765	0.001557	0.001291	0.001024	0.000734	0.001868
5_H2	0.000733	0.001141	0.001146	0.001019	0.000861	0.000718	0.000572	0.000408	0.001146
6_H1	0.001076	0.001771	0.001924	0.001816	0.001701	0.001523	0.001239	0.000875	0.001924
6_H2	0.001387	0.002179	0.002536	0.002624	0.002565	0.002383	0.001991	0.001396	0.002624
7_H1	0.001065	0.001666	0.001887	0.001943	0.001811	0.001645	0.001350	0.000923	0.001943
7_H2	0.001350	0.002170	0.002401	0.002510	0.002467	0.002242	0.001813	0.001257	0.002510
8_H1	0.001212	0.002025	0.002574	0.002903	0.002880	0.002577	0.002110	0.001412	0.002903
8_H2	0.001553	0.002480	0.002858	0.002931	0.002857	0.002661	0.002229	0.001562	0.002931
9_H1	0.001391	0.002239	0.002466	0.002412	0.002216	0.001913	0.001541	0.001081	0.002466
9_H2	0.001002	0.001592	0.001699	0.001622	0.001444	0.001234	0.000981	0.000689	0.001699
10_H1	0.001310	0.001969	0.002025	0.001868	0.001624	0.001333	0.001056	0.000752	0.002025
10_H2	0.000965	0.001499	0.001549	0.001417	0.001231	0.001026	0.000837	0.000607	0.001549
11_H1	0.001228	0.001889	0.001981	0.001879	0.001705	0.001474	0.001208	0.000865	0.001981
11_H2	0.001034	0.001617	0.001707	0.001597	0.001424	0.001220	0.001001	0.000723	0.001707

Min	0.000733	0.001141	0.001146	0.001019	0.000861	0.000718	0.000572	0.000408	0.001146
Max	0.001553	0.002480	0.002858	0.002931	0.002880	0.002661	0.002229	0.001562	0.002931
Mean	0.001157	0.001822	0.001981	0.001936	0.001789	0.001577	0.001287	0.000906	0.002010
σ	0.000186	0.000304	0.000406	0.000489	0.000526	0.000507	0.000424	0.000285	0.000451
Mean-σ	0.000971	0.001518	0.001574	0.001447	0.001263	0.001070	0.000863	0.000621	0.001559
Mean+σ	0.001344	0.002126	0.002387	0.002425	0.002315	0.002084	0.001711	0.001190	0.002462
Q1	0.001050	0.001621	0.001719	0.001658	0.001489	0.001294	0.001032	0.000739	0.001719
Median	0.001180	0.001831	0.001939	0.001863	0.001697	0.001474	0.001190	0.000847	0.001948
Q3	0.001245	0.001978	0.002188	0.002127	0.001977	0.001752	0.001429	0.000997	0.002188

Table A.38 IDR results (Bldg: U2 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001145	0.001868	0.002023	0.001902	0.001869	0.001724	0.001415	0.000962	0.002023
1_H2	0.001230	0.001942	0.002057	0.001924	0.001700	0.001434	0.001133	0.000788	0.002057
2_H1	0.001200	0.001859	0.001926	0.001761	0.001544	0.001351	0.001106	0.000764	0.001926
2_H2	0.000828	0.001359	0.001428	0.001331	0.001220	0.001099	0.000929	0.000654	0.001428
3_H1	0.001190	0.001906	0.002058	0.001969	0.001804	0.001596	0.001297	0.000899	0.002058
3_H2	0.001172	0.001952	0.002185	0.002135	0.001954	0.001699	0.001347	0.000922	0.002185
4_H1	0.001044	0.001663	0.001846	0.001806	0.001642	0.001412	0.001109	0.000776	0.001846
4_H2	0.001045	0.001620	0.001749	0.001685	0.001536	0.001357	0.001107	0.000768	0.001749
5_H1	0.000718	0.001150	0.001177	0.001042	0.000882	0.000733	0.000576	0.000413	0.001177
5_H2	0.001135	0.001752	0.001840	0.001719	0.001508	0.001260	0.001014	0.000698	0.001840
6_H1	0.001393	0.002225	0.002607	0.002694	0.002643	0.002459	0.002038	0.001387	0.002694
6_H2	0.001083	0.001812	0.002073	0.002105	0.002003	0.001791	0.001444	0.000987	0.002105
7_H1	0.001337	0.002198	0.002438	0.002437	0.002387	0.002172	0.001756	0.001189	0.002438
7_H2	0.001078	0.001768	0.001945	0.002005	0.001883	0.001702	0.001408	0.000942	0.002005
8_H1	0.001537	0.002508	0.002849	0.002901	0.002827	0.002627	0.002184	0.001483	0.002901
8_H2	0.001251	0.002161	0.002753	0.003102	0.003094	0.002711	0.002176	0.001388	0.003102
9_H1	0.001045	0.001734	0.001926	0.001860	0.001680	0.001449	0.001156	0.000804	0.001926
9_H2	0.001371	0.002253	0.002505	0.002448	0.002244	0.001946	0.001534	0.001029	0.002505
10_H1	0.000975	0.001542	0.001615	0.001474	0.001281	0.001089	0.000870	0.000608	0.001615
10_H2	0.001292	0.001978	0.002061	0.001911	0.001670	0.001387	0.001067	0.000721	0.002061
11_H1	0.001040	0.001678	0.001812	0.001705	0.001510	0.001290	0.001026	0.000701	0.001812
11_H2	0.001206	0.001895	0.002019	0.001907	0.001715	0.001485	0.001183	0.000809	0.002019

Min	0.000718	0.001150	0.001177	0.001042	0.000882	0.000733	0.000576	0.000413	0.001177
Max	0.001537	0.002508	0.002849	0.003102	0.003094	0.002711	0.002184	0.001483	0.003102
Mean	0.001151	0.001856	0.002041	0.001992	0.001845	0.001626	0.001313	0.000895	0.002067
σ	0.000184	0.000306	0.000404	0.000487	0.000527	0.000501	0.000416	0.000268	0.000448
Mean- σ	0.000966	0.001549	0.001636	0.001505	0.001318	0.001125	0.000897	0.000627	0.001618
Mean+ σ	0.001335	0.002162	0.002445	0.002479	0.002373	0.002127	0.001728	0.001163	0.002515
Q1	0.001045	0.001692	0.001842	0.001730	0.001538	0.001353	0.001077	0.000732	0.001842
Median	0.001159	0.001864	0.002021	0.001909	0.001708	0.001467	0.001170	0.000807	0.002021
Q3	0.001246	0.001972	0.002157	0.002128	0.001991	0.001774	0.001437	0.000981	0.002165

Table A.39 IDR results (Bldg: U2 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001382	0.002215	0.002392	0.002228	0.001939	0.001669	0.001374	0.000982	0.002392
1_H2	0.001383	0.002209	0.002402	0.002302	0.002073	0.001747	0.001398	0.000969	0.002402
2_H1	0.001555	0.002491	0.002697	0.002517	0.002562	0.002312	0.001796	0.001190	0.002697
2_H2	0.002212	0.003304	0.003417	0.003155	0.002748	0.002227	0.001661	0.001175	0.003417
3_H1	0.001306	0.002140	0.002445	0.002611	0.002649	0.002426	0.001943	0.001317	0.002649
3_H2	0.001763	0.002885	0.003261	0.003207	0.002892	0.002428	0.001969	0.001391	0.003261
4_H1	0.001381	0.002135	0.002405	0.002385	0.002160	0.001799	0.001378	0.000944	0.002405
4_H2	0.001675	0.002502	0.002592	0.002386	0.002056	0.001678	0.001277	0.000881	0.002592
5_H1	0.001684	0.002614	0.002793	0.002681	0.002394	0.002000	0.001564	0.001087	0.002793
5_H2	0.001349	0.002100	0.002208	0.002037	0.001740	0.001477	0.001199	0.000846	0.002208
6_H1	0.001429	0.002237	0.002420	0.002338	0.002142	0.001859	0.001503	0.001058	0.002420
6_H2	0.001568	0.002523	0.002771	0.002656	0.002414	0.002124	0.001722	0.001200	0.002771
7_H1	0.001119	0.001732	0.001916	0.001871	0.001695	0.001446	0.001157	0.000815	0.001916
7_H2	0.001363	0.002085	0.002165	0.002006	0.001744	0.001505	0.001230	0.000876	0.002165
8_H1	0.001415	0.002084	0.002002	0.001865	0.001676	0.001487	0.001233	0.000874	0.002084
8_H2	0.001537	0.002462	0.002754	0.002774	0.002619	0.002311	0.001874	0.001309	0.002774
9_H1	0.001851	0.002973	0.003290	0.003165	0.002797	0.002371	0.001896	0.001323	0.003290
9_H2	0.001787	0.002851	0.003186	0.003154	0.002895	0.002472	0.001948	0.001386	0.003186
10_H1	0.001940	0.003019	0.003268	0.003261	0.003077	0.002709	0.002270	0.001588	0.003268
10_H2	0.001904	0.002971	0.003173	0.003148	0.003113	0.002884	0.002432	0.001740	0.003173
11_H1	0.001577	0.002407	0.002570	0.002544	0.002277	0.002014	0.001698	0.001216	0.002570
11_H2	0.001599	0.002364	0.002372	0.002197	0.002012	0.001816	0.001497	0.001058	0.002372

Min	0.001119	0.001732	0.001916	0.001865	0.001676	0.001446	0.001157	0.000815	0.001916
Max	0.002212	0.003304	0.003417	0.003261	0.003113	0.002884	0.002432	0.001740	0.003417
Mean	0.001581	0.002468	0.002659	0.002568	0.002349	0.002035	0.001637	0.001147	0.002673
σ	0.000255	0.000393	0.000443	0.000456	0.000459	0.000420	0.000353	0.000249	0.000435
Mean- σ	0.001326	0.002075	0.002216	0.002112	0.001890	0.001615	0.001285	0.000898	0.002238
Mean+ σ	0.001836	0.002861	0.003102	0.003023	0.002808	0.002455	0.001990	0.001395	0.003108
Q1	0.001382	0.002157	0.002395	0.002247	0.002023	0.001695	0.001375	0.000950	0.002395
Median	0.001562	0.002435	0.002581	0.002531	0.002336	0.002007	0.001613	0.001131	0.002621
Q3	0.001743	0.002792	0.003078	0.003055	0.002723	0.002356	0.001891	0.001315	0.003078

Table A.40 IDR results (Bldg: U2 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001358	0.002205	0.002410	0.002305	0.002050	0.001779	0.001434	0.000967	0.002410
1_H2	0.001341	0.002156	0.002327	0.002174	0.001954	0.001691	0.001392	0.000948	0.002327
2_H1	0.002188	0.003330	0.003506	0.003304	0.002890	0.002339	0.001711	0.001162	0.003506
2_H2	0.001554	0.002509	0.002716	0.002558	0.002533	0.002294	0.001767	0.001120	0.002716
3_H1	0.001724	0.002883	0.003253	0.003197	0.002880	0.002435	0.001947	0.001340	0.003253
3_H2	0.001263	0.002134	0.002447	0.002585	0.002616	0.002391	0.001901	0.001240	0.002616
4_H1	0.001678	0.002565	0.002681	0.002500	0.002185	0.001801	0.001361	0.000891	0.002681
4_H2	0.001388	0.002139	0.002395	0.002356	0.002125	0.001775	0.001375	0.000925	0.002395
5_H1	0.001283	0.002034	0.002155	0.001997	0.001743	0.001489	0.001198	0.000830	0.002155
5_H2	0.001594	0.002500	0.002679	0.002540	0.002256	0.001895	0.001459	0.000976	0.002679
6_H1	0.001573	0.002563	0.002802	0.002675	0.002406	0.002091	0.001672	0.001133	0.002802
6_H2	0.001469	0.002349	0.002575	0.002512	0.002312	0.002023	0.001617	0.001109	0.002575
7_H1	0.001437	0.002251	0.002349	0.002142	0.001834	0.001593	0.001278	0.000883	0.002349
7_H2	0.001116	0.001716	0.001900	0.001821	0.001629	0.001393	0.001103	0.000757	0.001900
8_H1	0.001509	0.002490	0.002803	0.002802	0.002632	0.002321	0.001829	0.001227	0.002803
8_H2	0.001411	0.002109	0.002098	0.002022	0.001868	0.001683	0.001393	0.000980	0.002109
9_H1	0.001914	0.003111	0.003493	0.003489	0.003223	0.002756	0.002128	0.001431	0.003493
9_H2	0.001840	0.003047	0.003396	0.003280	0.002894	0.002402	0.001847	0.001232	0.003396
10_H1	0.001877	0.002976	0.003190	0.003227	0.003109	0.002844	0.002349	0.001608	0.003227
10_H2	0.001871	0.002959	0.003258	0.003258	0.003073	0.002712	0.002229	0.001521	0.003258
11_H1	0.001591	0.002361	0.002367	0.002179	0.002009	0.001810	0.001500	0.001035	0.002367
11_H2	0.001569	0.002434	0.002583	0.002514	0.002267	0.001977	0.001674	0.001177	0.002583

Min	0.001116	0.001716	0.001900	0.001821	0.001629	0.001393	0.001103	0.000757	0.001900
Max	0.002188	0.003330	0.003506	0.003489	0.003223	0.002844	0.002349	0.001608	0.003506
Mean	0.001570	0.002492	0.002699	0.002611	0.002386	0.002068	0.001644	0.001113	0.002709
σ	0.000255	0.000409	0.000467	0.000489	0.000475	0.000419	0.000333	0.000224	0.000466
Mean- σ	0.001315	0.002083	0.002232	0.002122	0.001911	0.001649	0.001311	0.000890	0.002244
Mean+ σ	0.001825	0.002901	0.003167	0.003100	0.002861	0.002487	0.001977	0.001337	0.003175
Q1	0.001394	0.002168	0.002374	0.002211	0.002019	0.001776	0.001392	0.000953	0.002374
Median	0.001562	0.002462	0.002631	0.002527	0.002290	0.002000	0.001645	0.001115	0.002648
Q3	0.001713	0.002804	0.003093	0.003098	0.002818	0.002378	0.001843	0.001231	0.003121

Table A.41 IDR results (Bldg: U2 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001768	0.002923	0.003374	0.003447	0.003273	0.002876	0.002324	0.001618	0.003447
1_H2	0.002037	0.002936	0.002902	0.002726	0.002470	0.002112	0.001685	0.001181	0.002936
2_H1	0.002255	0.003359	0.003432	0.003110	0.002638	0.002129	0.001607	0.001107	0.003432
2_H2	0.001299	0.002089	0.002312	0.002251	0.002031	0.001737	0.001396	0.000983	0.002312
3_H1	0.002122	0.003022	0.002984	0.002709	0.002330	0.001890	0.001452	0.001016	0.003022
3_H2	0.001350	0.002019	0.002067	0.001869	0.001594	0.001308	0.001031	0.000734	0.002067
4_H1	0.001666	0.002789	0.003331	0.003555	0.003445	0.003068	0.002502	0.001763	0.003555
4_H2	0.002125	0.003475	0.003954	0.003978	0.003673	0.003162	0.002721	0.001937	0.003978
5_H1	0.001880	0.002722	0.002680	0.002641	0.002507	0.002204	0.001738	0.001183	0.002722
5_H2	0.001778	0.002651	0.002735	0.002487	0.002340	0.002149	0.001791	0.001266	0.002735
6_H1	0.001482	0.002244	0.002320	0.002128	0.001839	0.001525	0.001217	0.000872	0.002320
6_H2	0.002293	0.003275	0.003228	0.002896	0.002449	0.001957	0.001483	0.001029	0.003275
7_H1	0.001553	0.002361	0.002448	0.002233	0.001906	0.001549	0.001175	0.000816	0.002448
7_H2	0.002165	0.003107	0.003067	0.002733	0.002312	0.001857	0.001414	0.000977	0.003107
8_H1	0.001551	0.002402	0.002568	0.002473	0.002220	0.001879	0.001536	0.001075	0.002568
8_H2	0.001621	0.002418	0.002513	0.002330	0.002038	0.001698	0.001311	0.000912	0.002513
9_H1	0.001736	0.002719	0.003023	0.003037	0.002966	0.002671	0.002208	0.001552	0.003037
9_H2	0.001863	0.002958	0.003414	0.003554	0.003540	0.003317	0.002772	0.001937	0.003554
10_H1	0.001430	0.002221	0.002520	0.002543	0.002414	0.002156	0.001740	0.001212	0.002543
10_H2	0.001999	0.003246	0.004082	0.004684	0.004700	0.004079	0.003080	0.002028	0.004700
11_H1	0.002070	0.003194	0.003411	0.003297	0.003302	0.002995	0.002380	0.001608	0.003411
11_H2	0.001529	0.002419	0.002663	0.002633	0.002417	0.002103	0.001685	0.001181	0.002663

Min	0.001299	0.002019	0.002067	0.001869	0.001594	0.001308	0.001031	0.000734	0.002067
Max	0.002293	0.003475	0.004082	0.004684	0.004700	0.004079	0.003080	0.002028	0.004700
Mean	0.001799	0.002752	0.002956	0.002878	0.002655	0.002292	0.001829	0.001272	0.003016
σ	0.000302	0.000433	0.000532	0.000665	0.000736	0.000694	0.000574	0.000389	0.000621
Mean- σ	0.001497	0.002319	0.002424	0.002213	0.001919	0.001597	0.001255	0.000883	0.002394
Mean+ σ	0.002101	0.003185	0.003487	0.003542	0.003391	0.002986	0.002403	0.001662	0.003637
Q1	0.001552	0.002406	0.002532	0.002477	0.002243	0.001863	0.001424	0.000991	0.002549
Median	0.001773	0.002756	0.002943	0.002718	0.002433	0.002121	0.001685	0.001181	0.002979
Q3	0.002062	0.003086	0.003363	0.003250	0.003196	0.002825	0.002295	0.001594	0.003427

Table A.42 IDR results (Bldg: U2 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001999	0.002945	0.002977	0.002899	0.002635	0.002256	0.001775	0.001210	0.002977
1_H2	0.001782	0.003002	0.003478	0.003547	0.003355	0.002965	0.002368	0.001603	0.003547
2_H1	0.001308	0.002199	0.002496	0.002456	0.002240	0.001924	0.001505	0.001007	0.002496
2_H2	0.002230	0.003322	0.003381	0.003064	0.002601	0.002091	0.001554	0.001021	0.003381
3_H1	0.001338	0.002048	0.002105	0.001912	0.001629	0.001324	0.001060	0.000758	0.002105
3_H2	0.002094	0.002990	0.002965	0.002672	0.002282	0.001851	0.001396	0.000940	0.002990
4_H1	0.002237	0.003747	0.004275	0.004265	0.003929	0.003367	0.002600	0.001712	0.004275
4_H2	0.001798	0.003087	0.003607	0.003771	0.003643	0.003225	0.002545	0.001737	0.003771
5_H1	0.001868	0.002813	0.002869	0.002597	0.002359	0.002112	0.001697	0.001163	0.002869
5_H2	0.001834	0.002657	0.002679	0.002738	0.002604	0.002300	0.001815	0.001194	0.002738
6_H1	0.002257	0.003235	0.003181	0.002824	0.002370	0.001891	0.001391	0.000912	0.003235
6_H2	0.001452	0.002207	0.002263	0.002057	0.001763	0.001486	0.001213	0.000844	0.002263
7_H1	0.002099	0.003028	0.003027	0.002749	0.002369	0.001929	0.001443	0.000966	0.003028
7_H2	0.001653	0.002535	0.002641	0.002429	0.002095	0.001724	0.001318	0.000888	0.002641
8_H1	0.001599	0.002412	0.002491	0.002300	0.002007	0.001667	0.001274	0.000849	0.002491
8_H2	0.001566	0.002415	0.002602	0.002473	0.002241	0.002013	0.001626	0.001105	0.002602
9_H1	0.001832	0.002953	0.003391	0.003557	0.003547	0.003314	0.002738	0.001843	0.003557
9_H2	0.001701	0.002706	0.003003	0.002981	0.002866	0.002612	0.002144	0.001460	0.003003
10_H1	0.002006	0.003317	0.004049	0.004620	0.004625	0.004017	0.003001	0.001896	0.004625
10_H2	0.001422	0.002319	0.002647	0.002671	0.002519	0.002222	0.001746	0.001162	0.002671
11_H1	0.001557	0.002521	0.002791	0.002736	0.002514	0.002178	0.001711	0.001146	0.002791
11_H2	0.002076	0.003234	0.003460	0.003321	0.003246	0.002922	0.002283	0.001492	0.003460

Min	0.001308	0.002048	0.002105	0.001912	0.001629	0.001324	0.001060	0.000758	0.002105
Max	0.002257	0.003747	0.004275	0.004620	0.004625	0.004017	0.003001	0.001896	0.004625
Mean	0.001805	0.002804	0.003017	0.002938	0.002702	0.002336	0.001827	0.001223	0.003069
σ	0.000295	0.000439	0.000547	0.000674	0.000739	0.000692	0.000545	0.000351	0.000623
Mean- σ	0.001510	0.002365	0.002470	0.002264	0.001963	0.001644	0.001283	0.000872	0.002446
Mean+ σ	0.002100	0.003244	0.003565	0.003612	0.003441	0.003028	0.002372	0.001574	0.003692
Q1	0.001574	0.002442	0.002643	0.002504	0.002251	0.001899	0.001408	0.000947	0.002649
Median	0.001815	0.002879	0.002971	0.002744	0.002517	0.002145	0.001704	0.001154	0.002984
Q3	0.002059	0.003072	0.003389	0.003257	0.003151	0.002845	0.002248	0.001484	0.003440

Table A.43 IDR results (Bldg: U3 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001321	0.002057	0.002227	0.002144	0.001922	0.001617	0.001317	0.000958	0.002227
1_H2	0.001223	0.001935	0.002094	0.002018	0.001906	0.001722	0.001518	0.001122	0.002094
2_H1	0.000921	0.001461	0.001483	0.001391	0.001262	0.001124	0.001018	0.000775	0.001483
2_H2	0.001305	0.001973	0.002014	0.001868	0.001622	0.001406	0.001176	0.000871	0.002014
3_H1	0.001331	0.002138	0.002341	0.002347	0.002185	0.001880	0.001585	0.001157	0.002347
3_H2	0.001271	0.001962	0.002036	0.001977	0.001806	0.001572	0.001359	0.001008	0.002036
4_H1	0.001117	0.001726	0.001865	0.001825	0.001666	0.001453	0.001258	0.000936	0.001865
4_H2	0.001101	0.001705	0.001871	0.001894	0.001749	0.001486	0.001265	0.000931	0.001894
5_H1	0.001225	0.001844	0.001912	0.001874	0.001675	0.001365	0.001138	0.000853	0.001912
5_H2	0.000792	0.001225	0.001240	0.001158	0.001010	0.000805	0.000688	0.000530	0.001240
6_H1	0.001124	0.001806	0.001959	0.001918	0.001783	0.001575	0.001356	0.000996	0.001959
6_H2	0.001482	0.002439	0.002782	0.002891	0.002812	0.002555	0.002202	0.001601	0.002891
7_H1	0.001129	0.001769	0.001955	0.002075	0.001963	0.001715	0.001507	0.001070	0.002075
7_H2	0.001425	0.002267	0.002503	0.002602	0.002557	0.002336	0.001969	0.001410	0.002602
8_H1	0.001302	0.002086	0.002619	0.003100	0.003163	0.002744	0.002199	0.001517	0.003163
8_H2	0.001675	0.002711	0.003119	0.003182	0.003115	0.002877	0.002433	0.001735	0.003182
9_H1	0.001541	0.002468	0.002762	0.002757	0.002536	0.002169	0.001773	0.001273	0.002762
9_H2	0.001058	0.001689	0.001808	0.001768	0.001608	0.001373	0.001174	0.000870	0.001808
10_H1	0.001341	0.002007	0.002107	0.002009	0.001767	0.001438	0.001186	0.000883	0.002107
10_H2	0.001022	0.001578	0.001666	0.001576	0.001379	0.001129	0.000931	0.000699	0.001666
11_H1	0.001306	0.002000	0.002133	0.002064	0.001872	0.001602	0.001347	0.000990	0.002133
11_H2	0.001090	0.001702	0.001847	0.001778	0.001583	0.001335	0.001135	0.000840	0.001847

Min	0.000792	0.001225	0.001240	0.001158	0.001010	0.000805	0.000688	0.000530	0.001240
Max	0.001675	0.002711	0.003119	0.003182	0.003163	0.002877	0.002433	0.001735	0.003182
Mean	0.001232	0.001934	0.002107	0.002101	0.001952	0.001694	0.001433	0.001047	0.002150
σ	0.000204	0.000342	0.000442	0.000521	0.000564	0.000534	0.000440	0.000299	0.000501
Mean- σ	0.001028	0.001592	0.001665	0.001579	0.001388	0.001161	0.000994	0.000748	0.001650
Mean+ σ	0.001436	0.002276	0.002548	0.002622	0.002515	0.002228	0.001873	0.001345	0.002651
Q1	0.001105	0.001710	0.001867	0.001836	0.001633	0.001381	0.001175	0.000870	0.001872
Median	0.001248	0.001949	0.002025	0.001993	0.001795	0.001574	0.001332	0.000974	0.002056
Q3	0.001329	0.002079	0.002313	0.002296	0.002130	0.001841	0.001568	0.001148	0.002317

Table A.44 IDR results (Bldg: U3 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001152	0.001874	0.001964	0.002015	0.001990	0.001754	0.001388	0.000928	0.002015
1_H2	0.001174	0.001859	0.001957	0.001884	0.001697	0.001421	0.001128	0.000764	0.001957
2_H1	0.001199	0.001852	0.001856	0.001662	0.001458	0.001302	0.001097	0.000756	0.001856
2_H2	0.000798	0.001274	0.001378	0.001328	0.001221	0.001076	0.000864	0.000576	0.001378
3_H1	0.001192	0.001904	0.002022	0.001984	0.001812	0.001544	0.001198	0.000805	0.002022
3_H2	0.001135	0.001873	0.002146	0.002140	0.001946	0.001634	0.001251	0.000839	0.002146
4_H1	0.000977	0.001601	0.001766	0.001717	0.001537	0.001340	0.001089	0.000731	0.001766
4_H2	0.000971	0.001542	0.001644	0.001534	0.001394	0.001274	0.001085	0.000752	0.001644
5_H1	0.000699	0.001116	0.001083	0.001057	0.000908	0.000691	0.000541	0.000373	0.001116
5_H2	0.001117	0.001724	0.001832	0.001745	0.001524	0.001231	0.000937	0.000635	0.001832
6_H1	0.001347	0.002155	0.002449	0.002490	0.002453	0.002329	0.001971	0.001329	0.002490
6_H2	0.001011	0.001712	0.002040	0.002135	0.002033	0.001766	0.001365	0.000905	0.002135
7_H1	0.001323	0.002173	0.002355	0.002509	0.002428	0.002143	0.001689	0.001120	0.002509
7_H2	0.001074	0.001718	0.001897	0.001924	0.001796	0.001655	0.001308	0.000847	0.001924
8_H1	0.001498	0.002396	0.002663	0.002692	0.002654	0.002483	0.002049	0.001376	0.002692
8_H2	0.001217	0.002153	0.002742	0.003135	0.003108	0.002710	0.002147	0.001348	0.003135
9_H1	0.001017	0.001642	0.001808	0.001786	0.001601	0.001320	0.000998	0.000674	0.001808
9_H2	0.001279	0.002097	0.002270	0.002162	0.001969	0.001740	0.001411	0.000942	0.002270
10_H1	0.000991	0.001541	0.001569	0.001409	0.001231	0.001070	0.000869	0.000595	0.001569
10_H2	0.001309	0.002001	0.002028	0.001822	0.001576	0.001346	0.001081	0.000729	0.002028
11_H1	0.001038	0.001670	0.001755	0.001607	0.001415	0.001244	0.001026	0.000699	0.001755
11_H2	0.001189	0.001863	0.001927	0.001767	0.001581	0.001408	0.001161	0.000787	0.001927

Min	0.000699	0.001116	0.001083	0.001057	0.000908	0.000691	0.000541	0.000373	0.001116
Max	0.001498	0.002396	0.002742	0.003135	0.003108	0.002710	0.002147	0.001376	0.003135
Mean	0.001123	0.001806	0.001961	0.001932	0.001788	0.001567	0.001257	0.000841	0.001999
σ	0.000182	0.000300	0.000387	0.000473	0.000515	0.000489	0.000400	0.000256	0.000440
Mean- σ	0.000941	0.001507	0.001575	0.001459	0.001273	0.001079	0.000857	0.000586	0.001558
Mean+ σ	0.001305	0.002106	0.002348	0.002405	0.002303	0.002056	0.001657	0.001097	0.002439
Q1	0.001013	0.001649	0.001777	0.001676	0.001475	0.001281	0.001040	0.000707	0.001777
Median	0.001144	0.001856	0.001942	0.001853	0.001649	0.001415	0.001145	0.000776	0.001942
Q3	0.001213	0.001977	0.002120	0.002139	0.001985	0.001751	0.001382	0.000922	0.002143

Table A.45 IDR results (Bldg: U3 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001534	0.002410	0.002551	0.002433	0.002137	0.001789	0.001502	0.001108	0.002551
1_H2	0.001467	0.002289	0.002474	0.002414	0.002151	0.001802	0.001469	0.001061	0.002474
2_H1	0.001745	0.002755	0.002931	0.002768	0.002745	0.002486	0.002019	0.001383	0.002931
2_H2	0.002271	0.003376	0.003530	0.003376	0.002983	0.002404	0.001872	0.001316	0.003530
3_H1	0.001415	0.002224	0.002523	0.002796	0.002834	0.002549	0.002085	0.001471	0.002834
3_H2	0.001960	0.003166	0.003537	0.003562	0.003247	0.002722	0.002120	0.001518	0.003562
4_H1	0.001524	0.002381	0.002726	0.002771	0.002543	0.002125	0.001708	0.001212	0.002771
4_H2	0.001780	0.002644	0.002705	0.002575	0.002248	0.001806	0.001436	0.001033	0.002705
5_H1	0.001768	0.002723	0.002909	0.002830	0.002541	0.002119	0.001701	0.001219	0.002909
5_H2	0.001402	0.002154	0.002219	0.002087	0.001812	0.001552	0.001309	0.000958	0.002219
6_H1	0.001525	0.002376	0.002608	0.002589	0.002375	0.002026	0.001648	0.001192	0.002608
6_H2	0.001664	0.002641	0.002918	0.002894	0.002643	0.002231	0.001861	0.001348	0.002918
7_H1	0.001197	0.001877	0.002072	0.002071	0.001895	0.001610	0.001345	0.000980	0.002072
7_H2	0.001447	0.002192	0.002230	0.002177	0.001986	0.001696	0.001416	0.001032	0.002230
8_H1	0.001487	0.002162	0.002118	0.002022	0.001789	0.001606	0.001421	0.001061	0.002162
8_H2	0.001634	0.002603	0.002938	0.003008	0.002850	0.002491	0.002055	0.001480	0.003008
9_H1	0.001961	0.003123	0.003414	0.003293	0.002944	0.002562	0.002106	0.001513	0.003414
9_H2	0.002002	0.003149	0.003504	0.003569	0.003345	0.002853	0.002313	0.001686	0.003569
10_H1	0.002082	0.003219	0.003494	0.003429	0.003211	0.002936	0.002519	0.001790	0.003494
10_H2	0.002053	0.003197	0.003467	0.003599	0.003555	0.003236	0.002856	0.002099	0.003599
11_H1	0.001713	0.002581	0.002663	0.002698	0.002415	0.002172	0.001916	0.001414	0.002698
11_H2	0.001711	0.002518	0.002535	0.002403	0.002199	0.001910	0.001638	0.001191	0.002535

Min	0.001197	0.001877	0.002072	0.002022	0.001789	0.001552	0.001309	0.000958	0.002072
Max	0.002271	0.003376	0.003537	0.003599	0.003555	0.003236	0.002856	0.002099	0.003599
Mean	0.001697	0.002625	0.002821	0.002789	0.002566	0.002213	0.001833	0.001321	0.002854
σ	0.000269	0.000421	0.000486	0.000508	0.000516	0.000476	0.000404	0.000288	0.000494
Mean-σ	0.001428	0.002204	0.002335	0.002282	0.002050	0.001737	0.001429	0.001033	0.002360
Mean+σ	0.001966	0.003047	0.003308	0.003297	0.003081	0.002689	0.002236	0.001609	0.003348
Q1	0.001496	0.002311	0.002526	0.002419	0.002163	0.001803	0.001477	0.001073	0.002539
Median	0.001688	0.002592	0.002716	0.002770	0.002542	0.002149	0.001785	0.001268	0.002803
Q3	0.001915	0.003031	0.003295	0.003222	0.002921	0.002535	0.002078	0.001478	0.003313

Table A.46 IDR results (Bldg: U3 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001342	0.002162	0.002436	0.002396	0.002162	0.001873	0.001540	0.001028	0.002436
1_H2	0.001253	0.002031	0.002251	0.002177	0.001973	0.001711	0.001350	0.000892	0.002251
2_H1	0.002205	0.003360	0.003458	0.003181	0.002757	0.002259	0.001718	0.001176	0.003458
2_H2	0.001485	0.002387	0.002512	0.002379	0.002393	0.002150	0.001665	0.001056	0.002512
3_H1	0.001712	0.002708	0.003097	0.003113	0.002791	0.002318	0.001900	0.001254	0.003113
3_H2	0.001228	0.002079	0.002391	0.002587	0.002592	0.002312	0.001799	0.001160	0.002592
4_H1	0.001685	0.002576	0.002649	0.002432	0.002118	0.001764	0.001357	0.000888	0.002649
4_H2	0.001362	0.002178	0.002383	0.002275	0.002024	0.001705	0.001321	0.000869	0.002383
5_H1	0.001255	0.002017	0.002210	0.002117	0.001862	0.001540	0.001177	0.000788	0.002210
5_H2	0.001530	0.002414	0.002600	0.002477	0.002174	0.001770	0.001320	0.000863	0.002600
6_H1	0.001515	0.002507	0.002810	0.002733	0.002443	0.002073	0.001605	0.001054	0.002810
6_H2	0.001393	0.002285	0.002578	0.002550	0.002299	0.001917	0.001478	0.000985	0.002578
7_H1	0.001337	0.002121	0.002278	0.002137	0.001819	0.001445	0.001110	0.000748	0.002278
7_H2	0.001064	0.001699	0.001797	0.001750	0.001540	0.001295	0.001064	0.000705	0.001797
8_H1	0.001479	0.002441	0.002680	0.002629	0.002473	0.002229	0.001801	0.001179	0.002680
8_H2	0.001409	0.002109	0.002048	0.002007	0.001860	0.001617	0.001272	0.000867	0.002109
9_H1	0.001764	0.002903	0.003332	0.003373	0.003091	0.002561	0.001899	0.001247	0.003373
9_H2	0.001790	0.003003	0.003428	0.003382	0.002981	0.002407	0.001820	0.001163	0.003428
10_H1	0.001804	0.002837	0.002951	0.003004	0.002910	0.002604	0.002113	0.001438	0.003004
10_H2	0.001777	0.002851	0.003188	0.003246	0.003066	0.002666	0.002149	0.001451	0.003246
11_H1	0.001518	0.002251	0.002243	0.002176	0.002001	0.001753	0.001408	0.000947	0.002251
11_H2	0.001589	0.002470	0.002500	0.002438	0.002216	0.001877	0.001557	0.001056	0.002500

Min	0.001064	0.001699	0.001797	0.001750	0.001540	0.001295	0.001064	0.000705	0.001797
Max	0.002205	0.003360	0.003458	0.003382	0.003091	0.002666	0.002149	0.001451	0.003458
Mean	0.001523	0.002427	0.002628	0.002571	0.002343	0.001993	0.001565	0.001037	0.002648
σ	0.000256	0.000393	0.000452	0.000465	0.000444	0.000389	0.000310	0.000206	0.000455
Mean- σ	0.001267	0.002034	0.002176	0.002106	0.001899	0.001604	0.001255	0.000831	0.002193
Mean+ σ	0.001778	0.002820	0.003081	0.003036	0.002787	0.002382	0.001874	0.001243	0.003103
Q1	0.001347	0.002131	0.002304	0.002202	0.002007	0.001722	0.001328	0.000874	0.002304
Median	0.001500	0.002401	0.002545	0.002458	0.002258	0.001897	0.001549	0.001041	0.002585
Q3	0.001705	0.002675	0.002916	0.002936	0.002716	0.002299	0.001801	0.001173	0.002956

Table A.47 IDR results (Bldg: U3 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001922	0.003112	0.003604	0.003717	0.003511	0.003060	0.002495	0.001777	0.003717
1_H2	0.002108	0.003022	0.002999	0.002888	0.002615	0.002199	0.001785	0.001294	0.003022
2_H1	0.002431	0.003591	0.003631	0.003366	0.002900	0.002314	0.001814	0.001299	0.003631
2_H2	0.001413	0.002209	0.002449	0.002427	0.002190	0.001835	0.001446	0.001054	0.002449
3_H1	0.002244	0.003191	0.003165	0.002929	0.002541	0.002060	0.001637	0.001183	0.003191
3_H2	0.001426	0.002109	0.002113	0.001961	0.001701	0.001399	0.001162	0.000855	0.002113
4_H1	0.001950	0.003138	0.003586	0.004064	0.003975	0.003311	0.002915	0.002193	0.004064
4_H2	0.002299	0.003705	0.004183	0.004264	0.003927	0.003369	0.002986	0.002261	0.004264
5_H1	0.002005	0.002856	0.002816	0.002932	0.002804	0.002488	0.002011	0.001406	0.002932
5_H2	0.001982	0.002911	0.002889	0.002693	0.002568	0.002286	0.001984	0.001465	0.002911
6_H1	0.001626	0.002440	0.002490	0.002337	0.002027	0.001646	0.001335	0.000973	0.002490
6_H2	0.002433	0.003472	0.003426	0.003122	0.002664	0.002130	0.001661	0.001191	0.003472
7_H1	0.001686	0.002529	0.002580	0.002375	0.002059	0.001689	0.001358	0.000983	0.002580
7_H2	0.002208	0.003211	0.003207	0.002970	0.002569	0.002071	0.001640	0.001181	0.003211
8_H1	0.001686	0.002611	0.002807	0.002718	0.002582	0.002277	0.001891	0.001354	0.002807
8_H2	0.001770	0.002630	0.002686	0.002545	0.002244	0.001851	0.001506	0.001091	0.002686
9_H1	0.002041	0.003169	0.003415	0.003484	0.003273	0.002910	0.002468	0.001779	0.003484
9_H2	0.002044	0.003267	0.003733	0.004014	0.004030	0.003730	0.003178	0.002283	0.004030
10_H1	0.001561	0.002486	0.002754	0.002824	0.002681	0.002348	0.001966	0.001450	0.002824
10_H2	0.002171	0.003480	0.004227	0.004921	0.004974	0.004333	0.003347	0.002265	0.004974
11_H1	0.002337	0.003565	0.003756	0.003650	0.003357	0.003048	0.002514	0.001761	0.003756
11_H2	0.001700	0.002668	0.002931	0.002922	0.002694	0.002308	0.001918	0.001410	0.002931

Min	0.001413	0.002109	0.002113	0.001961	0.001701	0.001399	0.001162	0.000855	0.002113
Max	0.002433	0.003705	0.004227	0.004921	0.004974	0.004333	0.003347	0.002283	0.004974
Mean	0.001957	0.002971	0.003157	0.003142	0.002904	0.002485	0.002046	0.001478	0.003252
σ	0.000311	0.000461	0.000568	0.000724	0.000788	0.000734	0.000628	0.000448	0.000691
Mean-σ	0.001645	0.002511	0.002589	0.002418	0.002116	0.001750	0.001418	0.001029	0.002561
Mean+σ	0.002268	0.003432	0.003725	0.003866	0.003692	0.003219	0.002674	0.001926	0.003943
Q1	0.001690	0.002616	0.002767	0.002699	0.002548	0.002063	0.001638	0.001182	0.002811
Median	0.001994	0.003067	0.003082	0.002931	0.002673	0.002297	0.001905	0.001380	0.003107
Q3	0.002199	0.003253	0.003600	0.003609	0.003336	0.003014	0.002488	0.001773	0.003696

Table A.48 IDR results (Bldg: U3 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001930	0.002849	0.002950	0.002927	0.002672	0.002237	0.001691	0.001116	0.002950
1_H2	0.001667	0.002849	0.003364	0.003482	0.003292	0.002855	0.002218	0.001464	0.003482
2_H1	0.001318	0.002233	0.002486	0.002406	0.002194	0.001920	0.001535	0.001020	0.002486
2_H2	0.002141	0.003193	0.003280	0.003011	0.002555	0.002009	0.001445	0.000933	0.003280
3_H1	0.001291	0.001968	0.002063	0.001906	0.001619	0.001344	0.001097	0.000738	0.002063
3_H2	0.002005	0.002861	0.002844	0.002587	0.002203	0.001731	0.001260	0.000842	0.002861
4_H1	0.002212	0.003699	0.004066	0.003971	0.003695	0.003285	0.002667	0.001782	0.004066
4_H2	0.001919	0.003252	0.003506	0.003541	0.003430	0.003191	0.002775	0.001901	0.003541
5_H1	0.001805	0.002738	0.002814	0.002550	0.002311	0.001995	0.001568	0.001055	0.002814
5_H2	0.001760	0.002572	0.002624	0.002532	0.002387	0.002090	0.001634	0.001054	0.002624
6_H1	0.002212	0.003196	0.003096	0.002700	0.002260	0.001836	0.001388	0.000897	0.003196
6_H2	0.001370	0.002087	0.002176	0.002049	0.001760	0.001418	0.001106	0.000747	0.002176
7_H1	0.002049	0.002961	0.002967	0.002665	0.002249	0.001822	0.001415	0.000928	0.002967
7_H2	0.001639	0.002513	0.002562	0.002304	0.001977	0.001656	0.001304	0.000878	0.002562
8_H1	0.001533	0.002310	0.002331	0.002112	0.001832	0.001545	0.001219	0.000809	0.002331
8_H2	0.001507	0.002322	0.002467	0.002337	0.002086	0.001810	0.001443	0.000985	0.002467
9_H1	0.001803	0.002819	0.003205	0.003290	0.003280	0.003013	0.002436	0.001628	0.003290
9_H2	0.001612	0.002577	0.002754	0.002820	0.002718	0.002452	0.002008	0.001362	0.002820
10_H1	0.001888	0.003151	0.004014	0.004565	0.004535	0.003888	0.002892	0.001811	0.004565
10_H2	0.001433	0.002363	0.002571	0.002462	0.002300	0.002079	0.001682	0.001133	0.002571
11_H1	0.001520	0.002473	0.002688	0.002585	0.002370	0.002089	0.001675	0.001113	0.002688
11_H2	0.002050	0.002984	0.003195	0.003245	0.003228	0.002923	0.002298	0.001461	0.003245

Min	0.001291	0.001968	0.002063	0.001906	0.001619	0.001344	0.001097	0.000738	0.002063
Max	0.002212	0.003699	0.004066	0.004565	0.004535	0.003888	0.002892	0.001901	0.004565
Mean	0.001757	0.002726	0.002910	0.002820	0.002589	0.002236	0.001762	0.001166	0.002957
σ	0.000289	0.000429	0.000527	0.000648	0.000715	0.000675	0.000550	0.000359	0.000601
Mean-σ	0.001469	0.002297	0.002383	0.002173	0.001874	0.001561	0.001212	0.000807	0.002356
Mean+σ	0.002046	0.003155	0.003437	0.003468	0.003304	0.002911	0.002311	0.001525	0.003558
Q1	0.001523	0.002391	0.002564	0.002420	0.002196	0.001813	0.001395	0.000905	0.002564
Median	0.001782	0.002779	0.002829	0.002626	0.002341	0.002044	0.001601	0.001055	0.002841
Q3	0.001986	0.002978	0.003203	0.003187	0.003101	0.002754	0.002166	0.001436	0.003271

Table A.49 IDR results (Bldg: U4 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001380	0.002161	0.002338	0.002231	0.002000	0.001713	0.001373	0.000983	0.002338
1_H2	0.001250	0.002003	0.002192	0.002083	0.001832	0.001685	0.001434	0.001036	0.002192
2_H1	0.000923	0.001482	0.001555	0.001420	0.001289	0.001188	0.001032	0.000761	0.001555
2_H2	0.001308	0.002014	0.002095	0.001911	0.001673	0.001473	0.001228	0.000895	0.002095
3_H1	0.001330	0.002170	0.002448	0.002421	0.002241	0.001972	0.001603	0.001145	0.002448
3_H2	0.001295	0.002014	0.002138	0.001989	0.001818	0.001631	0.001361	0.000989	0.002138
4_H1	0.001123	0.001790	0.002001	0.001946	0.001778	0.001575	0.001306	0.000947	0.002001
4_H2	0.001117	0.001753	0.001981	0.001943	0.001785	0.001570	0.001284	0.000924	0.001981
5_H1	0.001185	0.001805	0.001929	0.001849	0.001663	0.001413	0.001125	0.000822	0.001929
5_H2	0.000776	0.001229	0.001293	0.001178	0.001019	0.000861	0.000688	0.000500	0.001293
6_H1	0.001151	0.001820	0.002007	0.001938	0.001815	0.001643	0.001363	0.000979	0.002007
6_H2	0.001552	0.002569	0.002925	0.002969	0.002865	0.002645	0.002231	0.001599	0.002969
7_H1	0.001165	0.001838	0.002008	0.002113	0.002021	0.001787	0.001519	0.001054	0.002113
7_H2	0.001421	0.002295	0.002590	0.002634	0.002623	0.002428	0.002014	0.001426	0.002634
8_H1	0.001356	0.002124	0.002646	0.003090	0.003184	0.002881	0.002285	0.001546	0.003184
8_H2	0.001748	0.002890	0.003331	0.003400	0.003283	0.003034	0.002548	0.001817	0.003400
9_H1	0.001619	0.002620	0.002946	0.002908	0.002669	0.002312	0.001849	0.001308	0.002946
9_H2	0.001067	0.001749	0.001933	0.001841	0.001659	0.001458	0.001196	0.000863	0.001933
10_H1	0.001342	0.002032	0.002150	0.002037	0.001809	0.001514	0.001187	0.000864	0.002150
10_H2	0.001056	0.001651	0.001742	0.001606	0.001407	0.001200	0.000970	0.000704	0.001742
11_H1	0.001342	0.002079	0.002228	0.002124	0.001928	0.001688	0.001378	0.000996	0.002228
11_H2	0.001135	0.001794	0.001950	0.001856	0.001662	0.001438	0.001175	0.000853	0.001950

Min	0.000776	0.001229	0.001293	0.001178	0.001019	0.000861	0.000688	0.000500	0.001293
Max	0.001748	0.002890	0.003331	0.003400	0.003283	0.003034	0.002548	0.001817	0.003400
Mean	0.001256	0.001995	0.002201	0.002159	0.002001	0.001778	0.001461	0.001046	0.002238
σ	0.000222	0.000375	0.000469	0.000547	0.000585	0.000555	0.000460	0.000315	0.000516
Mean- σ	0.001035	0.001619	0.001732	0.001612	0.001416	0.001222	0.001001	0.000731	0.001721
Mean+ σ	0.001478	0.002370	0.002671	0.002705	0.002586	0.002333	0.001921	0.001361	0.002754
Q1	0.001126	0.001791	0.001958	0.001870	0.001666	0.001462	0.001189	0.000863	0.001958
Median	0.001273	0.002009	0.002117	0.002013	0.001817	0.001637	0.001362	0.000981	0.002126
Q3	0.001353	0.002152	0.002421	0.002374	0.002186	0.001926	0.001582	0.001122	0.002421

Table A.50 IDR results (Bldg: U4 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001121	0.001830	0.001926	0.002026	0.002005	0.001789	0.001393	0.000911	0.002026
1_H2	0.001132	0.001807	0.001895	0.001856	0.001688	0.001431	0.001102	0.000762	0.001895
2_H1	0.001161	0.001796	0.001808	0.001621	0.001422	0.001268	0.001058	0.000725	0.001808
2_H2	0.000784	0.001251	0.001353	0.001319	0.001215	0.001065	0.000840	0.000553	0.001353
3_H1	0.001165	0.001871	0.001993	0.001917	0.001746	0.001496	0.001164	0.000783	0.001993
3_H2	0.001098	0.001850	0.002117	0.002093	0.001892	0.001586	0.001196	0.000781	0.002117
4_H1	0.000966	0.001572	0.001736	0.001673	0.001489	0.001271	0.001021	0.000680	0.001736
4_H2	0.000953	0.001488	0.001584	0.001478	0.001342	0.001221	0.001028	0.000710	0.001584
5_H1	0.000680	0.001083	0.001062	0.001011	0.000863	0.000666	0.000508	0.000359	0.001083
5_H2	0.001105	0.001712	0.001813	0.001705	0.001480	0.001210	0.000923	0.000616	0.001813
6_H1	0.001331	0.002125	0.002299	0.002342	0.002312	0.002190	0.001838	0.001232	0.002342
6_H2	0.000977	0.001691	0.002006	0.002083	0.001976	0.001716	0.001330	0.000892	0.002083
7_H1	0.001265	0.002086	0.002376	0.002505	0.002409	0.002129	0.001659	0.001077	0.002505
7_H2	0.001048	0.001686	0.001868	0.001889	0.001753	0.001618	0.001285	0.000837	0.001889
8_H1	0.001469	0.002353	0.002543	0.002581	0.002553	0.002387	0.001960	0.001304	0.002581
8_H2	0.001209	0.002146	0.002704	0.003044	0.002992	0.002692	0.002132	0.001328	0.003044
9_H1	0.000978	0.001584	0.001680	0.001631	0.001442	0.001187	0.000902	0.000614	0.001680
9_H2	0.001179	0.001934	0.002088	0.001977	0.001788	0.001575	0.001268	0.000843	0.002088
10_H1	0.000978	0.001533	0.001568	0.001411	0.001227	0.001055	0.000841	0.000566	0.001568
10_H2	0.001281	0.001962	0.001987	0.001780	0.001535	0.001304	0.001033	0.000694	0.001987
11_H1	0.001012	0.001633	0.001722	0.001581	0.001395	0.001220	0.000993	0.000672	0.001722
11_H2	0.001151	0.001808	0.001873	0.001717	0.001536	0.001360	0.001108	0.000747	0.001873

Min	0.000680	0.001083	0.001062	0.001011	0.000863	0.000666	0.000508	0.000359	0.001083
Max	0.001469	0.002353	0.002704	0.003044	0.002992	0.002692	0.002132	0.001328	0.003044
Mean	0.001093	0.001764	0.001909	0.001875	0.001730	0.001520	0.001208	0.000804	0.001944
σ	0.000176	0.000291	0.000371	0.000455	0.000495	0.000479	0.000391	0.000245	0.000422
Mean-σ	0.000917	0.001473	0.001538	0.001419	0.001235	0.001041	0.000818	0.000559	0.001522
Mean+σ	0.001269	0.002055	0.002280	0.002330	0.002225	0.001999	0.001599	0.001049	0.002366
Q1	0.000978	0.001596	0.001726	0.001624	0.001427	0.001220	0.001000	0.000674	0.001726
Median	0.001113	0.001802	0.001884	0.001818	0.001612	0.001396	0.001105	0.000755	0.001892
Q3	0.001176	0.001918	0.002068	0.002069	0.001955	0.001692	0.001319	0.000880	0.002087

Table A.51 IDR results (Bldg: U4 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001543	0.002445	0.002647	0.002495	0.002183	0.001830	0.001515	0.001096	0.002647
1_H2	0.001493	0.002334	0.002545	0.002439	0.002171	0.001834	0.001484	0.001073	0.002545
2_H1	0.001792	0.002864	0.003133	0.002982	0.002832	0.002630	0.002119	0.001442	0.003133
2_H2	0.002275	0.003404	0.003581	0.003400	0.003032	0.002524	0.001933	0.001335	0.003581
3_H1	0.001412	0.002288	0.002537	0.002784	0.002845	0.002626	0.002129	0.001472	0.002845
3_H2	0.002018	0.003301	0.003775	0.003785	0.003485	0.002979	0.002333	0.001619	0.003785
4_H1	0.001544	0.002533	0.002930	0.002953	0.002737	0.002367	0.001872	0.001310	0.002953
4_H2	0.001760	0.002641	0.002783	0.002623	0.002311	0.001918	0.001480	0.001041	0.002783
5_H1	0.001755	0.002720	0.002947	0.002836	0.002551	0.002169	0.001708	0.001209	0.002947
5_H2	0.001359	0.002108	0.002218	0.002036	0.001834	0.001597	0.001295	0.000929	0.002218
6_H1	0.001547	0.002450	0.002714	0.002666	0.002453	0.002136	0.001715	0.001218	0.002714
6_H2	0.001712	0.002812	0.003198	0.003175	0.002915	0.002511	0.001989	0.001396	0.003198
7_H1	0.001230	0.001949	0.002182	0.002137	0.001960	0.001711	0.001383	0.000991	0.002182
7_H2	0.001454	0.002219	0.002314	0.002266	0.002087	0.001829	0.001480	0.001055	0.002314
8_H1	0.001451	0.002140	0.002199	0.002052	0.001844	0.001688	0.001447	0.001053	0.002199
8_H2	0.001682	0.002714	0.003093	0.003134	0.002964	0.002629	0.002124	0.001499	0.003134
9_H1	0.002005	0.003206	0.003543	0.003418	0.003078	0.002703	0.002220	0.001588	0.003543
9_H2	0.002088	0.003316	0.003775	0.003878	0.003675	0.003212	0.002534	0.001805	0.003878
10_H1	0.002160	0.003354	0.003635	0.003564	0.003323	0.003163	0.002731	0.001933	0.003635
10_H2	0.002143	0.003377	0.003720	0.003841	0.003756	0.003492	0.002939	0.002101	0.003841
11_H1	0.001683	0.002573	0.002782	0.002734	0.002462	0.002308	0.001973	0.001426	0.002782
11_H2	0.001766	0.002623	0.002683	0.002504	0.002225	0.001981	0.001649	0.001183	0.002683

Min	0.001230	0.001949	0.002182	0.002036	0.001834	0.001597	0.001295	0.000929	0.002182
Max	0.002275	0.003404	0.003775	0.003878	0.003756	0.003492	0.002939	0.002101	0.003878
Mean	0.001721	0.002699	0.002952	0.002896	0.002669	0.002356	0.001911	0.001353	0.002979
σ	0.000289	0.000456	0.000534	0.000573	0.000574	0.000541	0.000451	0.000315	0.000544
Mean-σ	0.001433	0.002243	0.002417	0.002323	0.002095	0.001815	0.001460	0.001039	0.002435
Mean+σ	0.002010	0.003154	0.003486	0.003468	0.003244	0.002897	0.002362	0.001668	0.003524
Q1	0.001506	0.002362	0.002571	0.002497	0.002194	0.001855	0.001492	0.001079	0.002656
Median	0.001698	0.002632	0.002857	0.002810	0.002644	0.002338	0.001903	0.001323	0.002896
Q3	0.001952	0.003121	0.003457	0.003344	0.003015	0.002630	0.002128	0.001492	0.003457

Table A.52 IDR results (Bldg: U4 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001364	0.002144	0.002410	0.002365	0.002191	0.001890	0.001538	0.001015	0.002410
1_H2	0.001217	0.002013	0.002278	0.002215	0.002014	0.001743	0.001363	0.000886	0.002278
2_H1	0.002165	0.003302	0.003392	0.003106	0.002676	0.002177	0.001691	0.001148	0.003392
2_H2	0.001427	0.002318	0.002442	0.002398	0.002399	0.002137	0.001631	0.001052	0.002442
3_H1	0.001685	0.002661	0.002980	0.002971	0.002656	0.002277	0.001826	0.001204	0.002980
3_H2	0.001180	0.002010	0.002304	0.002524	0.002520	0.002254	0.001748	0.001105	0.002524
4_H1	0.001661	0.002545	0.002616	0.002397	0.002080	0.001726	0.001317	0.000856	0.002616
4_H2	0.001324	0.002173	0.002374	0.002259	0.002004	0.001686	0.001303	0.000855	0.002374
5_H1	0.001252	0.002035	0.002227	0.002129	0.001878	0.001565	0.001199	0.000804	0.002227
5_H2	0.001476	0.002338	0.002515	0.002377	0.002071	0.001668	0.001220	0.000789	0.002515
6_H1	0.001491	0.002482	0.002775	0.002687	0.002393	0.002025	0.001566	0.001020	0.002775
6_H2	0.001403	0.002309	0.002594	0.002557	0.002306	0.001915	0.001440	0.000942	0.002594
7_H1	0.001286	0.002037	0.002177	0.002035	0.001732	0.001359	0.001036	0.000702	0.002177
7_H2	0.001017	0.001626	0.001707	0.001632	0.001432	0.001307	0.001051	0.000690	0.001707
8_H1	0.001406	0.002335	0.002581	0.002540	0.002384	0.002132	0.001703	0.001135	0.002581
8_H2	0.001370	0.002060	0.002002	0.001950	0.001798	0.001564	0.001233	0.000840	0.002060
9_H1	0.001723	0.002829	0.003209	0.003209	0.002920	0.002423	0.001807	0.001199	0.003209
9_H2	0.001810	0.003041	0.003467	0.003416	0.003009	0.002422	0.001814	0.001147	0.003467
10_H1	0.001715	0.002695	0.002887	0.002829	0.002807	0.002548	0.002043	0.001370	0.002887
10_H2	0.001728	0.002787	0.003137	0.003198	0.003017	0.002619	0.002093	0.001404	0.003198
11_H1	0.001472	0.002174	0.002190	0.002079	0.001926	0.001715	0.001386	0.000925	0.002190
11_H2	0.001551	0.002393	0.002445	0.002395	0.002176	0.001831	0.001509	0.001019	0.002445

Min	0.001017	0.001626	0.001707	0.001632	0.001432	0.001307	0.001036	0.000690	0.001707
Max	0.002165	0.003302	0.003467	0.003416	0.003017	0.002619	0.002093	0.001404	0.003467
Mean	0.001487	0.002378	0.002578	0.002512	0.002290	0.001954	0.001524	0.001005	0.002593
σ	0.000254	0.000391	0.000450	0.000455	0.000433	0.000375	0.000298	0.000197	0.000447
Mean- σ	0.001233	0.001987	0.002127	0.002057	0.001857	0.001579	0.001226	0.000808	0.002146
Mean+ σ	0.001742	0.002768	0.003028	0.002968	0.002724	0.002329	0.001821	0.001202	0.003040
Q1	0.001334	0.002081	0.002285	0.002226	0.002007	0.001693	0.001307	0.000855	0.002302
Median	0.001450	0.002327	0.002480	0.002398	0.002249	0.001903	0.001524	0.001017	0.002520
Q3	0.001679	0.002632	0.002859	0.002794	0.002622	0.002235	0.001737	0.001144	0.002859

Table A.53 IDR results (Bldg: U4 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001986	0.003271	0.003778	0.003841	0.003617	0.003190	0.002574	0.001816	0.003841
1_H2	0.002126	0.003065	0.003069	0.002957	0.002664	0.002266	0.001791	0.001267	0.003069
2_H1	0.002449	0.003652	0.003774	0.003476	0.003004	0.002462	0.001878	0.001313	0.003774
2_H2	0.001410	0.002263	0.002542	0.002481	0.002232	0.001897	0.001506	0.001071	0.002542
3_H1	0.002280	0.003270	0.003290	0.003024	0.002639	0.002191	0.001708	0.001215	0.003290
3_H2	0.001383	0.002065	0.002188	0.002067	0.001846	0.001576	0.001254	0.000894	0.002188
4_H1	0.001886	0.003156	0.003762	0.003990	0.003881	0.003452	0.002815	0.001999	0.003990
4_H2	0.002367	0.003847	0.004351	0.004319	0.004007	0.003513	0.002805	0.002015	0.004351
5_H1	0.001993	0.002888	0.003015	0.003101	0.002965	0.002654	0.002150	0.001505	0.003101
5_H2	0.001974	0.002958	0.003039	0.002753	0.002605	0.002380	0.001979	0.001426	0.003039
6_H1	0.001643	0.002503	0.002620	0.002419	0.002095	0.001740	0.001362	0.000973	0.002620
6_H2	0.002477	0.003558	0.003564	0.003224	0.002764	0.002263	0.001741	0.001230	0.003564
7_H1	0.001706	0.002587	0.002698	0.002488	0.002155	0.001790	0.001399	0.000993	0.002698
7_H2	0.002245	0.003301	0.003374	0.003096	0.002687	0.002217	0.001719	0.001218	0.003374
8_H1	0.001724	0.002717	0.002977	0.002988	0.002881	0.002593	0.002111	0.001487	0.002988
8_H2	0.001801	0.002707	0.002835	0.002656	0.002350	0.001987	0.001569	0.001115	0.002835
9_H1	0.002139	0.003378	0.003765	0.003748	0.003532	0.003195	0.002655	0.001898	0.003765
9_H2	0.002120	0.003432	0.004014	0.004275	0.004289	0.004016	0.003370	0.002396	0.004289
10_H1	0.001593	0.002566	0.002906	0.002930	0.002774	0.002478	0.002065	0.001492	0.002930
10_H2	0.002202	0.003570	0.004321	0.004984	0.005060	0.004490	0.003472	0.002333	0.005060
11_H1	0.002409	0.003714	0.004005	0.003876	0.003577	0.003140	0.002533	0.001797	0.004005
11_H2	0.001791	0.002828	0.003121	0.003049	0.002799	0.002430	0.002062	0.001491	0.003121

Min	0.001383	0.002065	0.002188	0.002067	0.001846	0.001576	0.001254	0.000894	0.002188
Max	0.002477	0.003847	0.004351	0.004984	0.005060	0.004490	0.003472	0.002396	0.005060
Mean	0.001987	0.003059	0.003319	0.003261	0.003019	0.002633	0.002114	0.001497	0.003383
σ	0.000326	0.000490	0.000596	0.000725	0.000793	0.000758	0.000625	0.000432	0.000693
Mean- σ	0.001660	0.002569	0.002723	0.002536	0.002226	0.001874	0.001490	0.001065	0.002690
Mean+ σ	0.002313	0.003549	0.003914	0.003986	0.003813	0.003391	0.002739	0.001930	0.004076
Q1	0.001741	0.002710	0.002924	0.002797	0.002614	0.002198	0.001711	0.001216	0.002945
Median	0.001990	0.003111	0.003206	0.003073	0.002787	0.002446	0.002021	0.001457	0.003206
Q3	0.002234	0.003419	0.003772	0.003818	0.003566	0.003178	0.002564	0.001811	0.003824

Table A.54 IDR results (Bldg: U4 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001887	0.002800	0.002906	0.002877	0.002627	0.002211	0.001684	0.001113	0.002906
1_H2	0.001615	0.002771	0.003264	0.003369	0.003185	0.002772	0.002156	0.001414	0.003369
2_H1	0.001284	0.002196	0.002456	0.002383	0.002174	0.001895	0.001501	0.000987	0.002456
2_H2	0.002083	0.003117	0.003198	0.002925	0.002480	0.001953	0.001394	0.000885	0.003198
3_H1	0.001265	0.001939	0.002013	0.001842	0.001564	0.001341	0.001079	0.000720	0.002013
3_H2	0.001952	0.002789	0.002768	0.002503	0.002120	0.001668	0.001199	0.000776	0.002789
4_H1	0.002071	0.003477	0.003862	0.003783	0.003527	0.003174	0.002649	0.001765	0.003862
4_H2	0.001803	0.003099	0.003415	0.003465	0.003364	0.003118	0.002625	0.001800	0.003465
5_H1	0.001775	0.002695	0.002758	0.002489	0.002204	0.001927	0.001503	0.000999	0.002758
5_H2	0.001760	0.002598	0.002621	0.002370	0.002211	0.001910	0.001476	0.000968	0.002621
6_H1	0.002162	0.003126	0.003034	0.002651	0.002216	0.001791	0.001337	0.000856	0.003126
6_H2	0.001314	0.002016	0.002129	0.001987	0.001701	0.001373	0.001071	0.000723	0.002129
7_H1	0.002023	0.002962	0.002966	0.002664	0.002232	0.001743	0.001334	0.000868	0.002966
7_H2	0.001582	0.002427	0.002474	0.002218	0.001891	0.001571	0.001242	0.000844	0.002474
8_H1	0.001495	0.002253	0.002259	0.002013	0.001733	0.001462	0.001139	0.000770	0.002259
8_H2	0.001501	0.002316	0.002444	0.002292	0.001988	0.001695	0.001328	0.000904	0.002444
9_H1	0.001722	0.002766	0.003135	0.003094	0.003033	0.002803	0.002270	0.001492	0.003135
9_H2	0.001512	0.002429	0.002623	0.002711	0.002611	0.002340	0.001913	0.001299	0.002711
10_H1	0.001849	0.003127	0.003958	0.004451	0.004405	0.003784	0.002816	0.001745	0.004451
10_H2	0.001415	0.002364	0.002594	0.002479	0.002326	0.002003	0.001589	0.001064	0.002594
11_H1	0.001470	0.002401	0.002623	0.002529	0.002320	0.002041	0.001627	0.001071	0.002623
11_H2	0.002018	0.002890	0.003026	0.003238	0.003205	0.002884	0.002243	0.001428	0.003238

Min	0.001265	0.001939	0.002013	0.001842	0.001564	0.001341	0.001071	0.000720	0.002013
Max	0.002162	0.003477	0.003958	0.004451	0.004405	0.003784	0.002816	0.001800	0.004451
Mean	0.001707	0.002662	0.002842	0.002742	0.002505	0.002157	0.001690	0.001113	0.002890
σ	0.000278	0.000403	0.000502	0.000627	0.000693	0.000658	0.000538	0.000348	0.000572
Mean-σ	0.001429	0.002259	0.002340	0.002116	0.001812	0.001499	0.001152	0.000765	0.002318
Mean+σ	0.001985	0.003065	0.003344	0.003369	0.003198	0.002815	0.002228	0.001462	0.003463
Q1	0.001497	0.002373	0.002504	0.002373	0.002134	0.001707	0.001330	0.000859	0.002504
Median	0.001741	0.002731	0.002763	0.002590	0.002276	0.001940	0.001502	0.000993	0.002774
Q3	0.001936	0.002944	0.003110	0.003052	0.002932	0.002664	0.002095	0.001385	0.003182

Table A.55 IDR results (Bldg: Symmetric Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001795	0.001926	0.002083	0.001947	0.001886	0.001531	0.001262	0.000937	0.002083
1_H2	0.001347	0.001867	0.001996	0.002160	0.002126	0.001871	0.001425	0.000909	0.002160
2_H1	0.001103	0.001303	0.001354	0.001233	0.001151	0.001076	0.000915	0.000647	0.001354
2_H2	0.001726	0.001874	0.001769	0.001737	0.001737	0.001464	0.001086	0.000794	0.001874
3_H1	0.001345	0.002005	0.002154	0.002138	0.001984	0.001680	0.001243	0.000785	0.002154
3_H2	0.001693	0.001994	0.002056	0.001973	0.001936	0.001661	0.001195	0.000771	0.002056
4_H1	0.001391	0.001673	0.001834	0.001735	0.001549	0.001324	0.001009	0.000654	0.001834
4_H2	0.001302	0.001611	0.001789	0.001642	0.001567	0.001327	0.000947	0.000659	0.001789
5_H1	0.001707	0.001679	0.001659	0.001645	0.001702	0.001366	0.000900	0.000542	0.001707
5_H2	0.000679	0.000967	0.000991	0.000925	0.000811	0.000642	0.000464	0.000313	0.000991
6_H1	0.001333	0.001853	0.002064	0.002080	0.001956	0.001681	0.001284	0.000870	0.002080
6_H2	0.001963	0.002173	0.002467	0.002597	0.002602	0.002430	0.001982	0.001296	0.002602
7_H1	0.001455	0.001750	0.001864	0.001970	0.002034	0.001719	0.001489	0.001050	0.002034
7_H2	0.001604	0.002196	0.002458	0.002511	0.002390	0.002163	0.001755	0.001165	0.002511
8_H1	0.001678	0.002277	0.002783	0.003031	0.002940	0.002696	0.002286	0.001476	0.003031
8_H2	0.002015	0.002557	0.002940	0.003114	0.003121	0.002904	0.002365	0.001530	0.003121
9_H1	0.001621	0.002286	0.002429	0.002469	0.002339	0.001971	0.001417	0.000859	0.002469
9_H2	0.001083	0.001690	0.001848	0.001786	0.001611	0.001349	0.001007	0.000649	0.001848
10_H1	0.001854	0.001769	0.001819	0.001707	0.001794	0.001430	0.000913	0.000682	0.001854
10_H2	0.001254	0.001482	0.001414	0.001347	0.001244	0.001015	0.000701	0.000490	0.001482
11_H1	0.001757	0.001888	0.001876	0.001876	0.001872	0.001567	0.001058	0.000772	0.001888
11_H2	0.001338	0.001691	0.001711	0.001696	0.001601	0.001324	0.000913	0.000546	0.001711

Min	0.000679	0.000967	0.000991	0.000925	0.000811	0.000642	0.000464	0.000313	0.000991
Max	0.002015	0.002557	0.002940	0.003114	0.003121	0.002904	0.002365	0.001530	0.003121
Mean	0.001502	0.001841	0.001971	0.001969	0.001907	0.001645	0.001255	0.000836	0.002029
σ	0.000321	0.000348	0.000454	0.000534	0.000545	0.000536	0.000482	0.000309	0.000499
Mean- σ	0.001181	0.001493	0.001517	0.001435	0.001362	0.001109	0.000773	0.000527	0.001530
Mean+ σ	0.001823	0.002190	0.002424	0.002503	0.002452	0.002181	0.001737	0.001146	0.002528
Q1	0.001334	0.001682	0.001774	0.001699	0.001604	0.001333	0.000923	0.000650	0.001800
Median	0.001530	0.001860	0.001870	0.001912	0.001879	0.001549	0.001141	0.000779	0.001961
Q3	0.001721	0.002002	0.002136	0.002155	0.002103	0.001833	0.001423	0.000930	0.002159

Table A.56 IDR results (Bldg: Symmetric Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001407	0.001874	0.001967	0.002062	0.002033	0.001858	0.001483	0.000978	0.002062
1_H2	0.001780	0.001951	0.002068	0.001949	0.001875	0.001536	0.001210	0.000878	0.002068
2_H1	0.001714	0.001848	0.001780	0.001760	0.001735	0.001480	0.001063	0.000763	0.001848
2_H2	0.001129	0.001314	0.001348	0.001255	0.001154	0.001068	0.000911	0.000629	0.001348
3_H1	0.001692	0.001999	0.002042	0.001993	0.001941	0.001646	0.001182	0.000777	0.002042
3_H2	0.001334	0.002005	0.002139	0.002112	0.001960	0.001666	0.001236	0.000785	0.002139
4_H1	0.001299	0.001609	0.001801	0.001661	0.001543	0.001313	0.000958	0.000661	0.001801
4_H2	0.001394	0.001684	0.001846	0.001749	0.001567	0.001339	0.001020	0.000666	0.001846
5_H1	0.000701	0.000988	0.000981	0.000910	0.000805	0.000648	0.000469	0.000316	0.000988
5_H2	0.001706	0.001688	0.001648	0.001637	0.001675	0.001354	0.000890	0.000532	0.001706
6_H1	0.001923	0.002134	0.002472	0.002621	0.002621	0.002450	0.002020	0.001328	0.002621
6_H2	0.001319	0.001849	0.002047	0.002014	0.001897	0.001674	0.001304	0.000903	0.002047
7_H1	0.001620	0.002206	0.002453	0.002494	0.002393	0.002162	0.001737	0.001135	0.002494
7_H2	0.001479	0.001753	0.001854	0.002019	0.002080	0.001741	0.001452	0.001011	0.002080
8_H1	0.002079	0.002504	0.002923	0.003153	0.003157	0.002870	0.002260	0.001432	0.003157
8_H2	0.001691	0.002227	0.002784	0.003118	0.003010	0.002714	0.002222	0.001400	0.003118
9_H1	0.001108	0.001686	0.001836	0.001771	0.001596	0.001335	0.000995	0.000638	0.001836
9_H2	0.001636	0.002289	0.002441	0.002484	0.002354	0.001985	0.001430	0.000869	0.002484
10_H1	0.001262	0.001509	0.001429	0.001370	0.001266	0.001028	0.000714	0.000486	0.001509
10_H2	0.001851	0.001763	0.001806	0.001724	0.001811	0.001445	0.000920	0.000668	0.001851
11_H1	0.001364	0.001712	0.001724	0.001715	0.001622	0.001338	0.000925	0.000539	0.001724
11_H2	0.001758	0.001881	0.001862	0.001896	0.001891	0.001581	0.001066	0.000767	0.001896

Min	0.000701	0.000988	0.000981	0.000910	0.000805	0.000648	0.000469	0.000316	0.000988
Max	0.002079	0.002504	0.002923	0.003153	0.003157	0.002870	0.002260	0.001432	0.003157
Mean	0.001511	0.001840	0.001966	0.001976	0.001908	0.001647	0.001249	0.000826	0.002030
σ	0.000316	0.000334	0.000452	0.000542	0.000556	0.000535	0.000466	0.000294	0.000510
Mean-σ	0.001195	0.001505	0.001514	0.001433	0.001353	0.001112	0.000783	0.000531	0.001520
Mean+σ	0.001827	0.002174	0.002418	0.002518	0.002464	0.002181	0.001714	0.001120	0.002541
Q1	0.001323	0.001687	0.001785	0.001717	0.001603	0.001338	0.000933	0.000644	0.001810
Median	0.001550	0.001849	0.001858	0.001923	0.001883	0.001559	0.001124	0.000772	0.001969
Q3	0.001712	0.002004	0.002121	0.002100	0.002068	0.001829	0.001447	0.000959	0.002124

Table A.57 IDR results (Bldg: Symmetric Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001743	0.002156	0.002503	0.002323	0.001972	0.001697	0.001415	0.000989	0.002503
1_H2	0.002208	0.002196	0.002407	0.002255	0.002206	0.001793	0.001411	0.001044	0.002407
2_H1	0.001950	0.002381	0.002373	0.002410	0.002557	0.002156	0.001488	0.001039	0.002557
2_H2	0.003488	0.003128	0.002698	0.003058	0.003319	0.002616	0.001653	0.001105	0.003488
3_H1	0.001509	0.002062	0.002342	0.002573	0.002603	0.002412	0.001944	0.001239	0.002603
3_H2	0.002283	0.002904	0.003105	0.003180	0.002947	0.002553	0.001913	0.001191	0.003180
4_H1	0.002052	0.002186	0.002434	0.002397	0.002186	0.001800	0.001313	0.000835	0.002434
4_H2	0.002518	0.002159	0.002066	0.002174	0.002392	0.001909	0.001381	0.001082	0.002518
5_H1	0.002338	0.002404	0.002223	0.002444	0.002492	0.002013	0.001231	0.000850	0.002492
5_H2	0.001813	0.002061	0.001946	0.002042	0.002015	0.001669	0.001121	0.000774	0.002061
6_H1	0.001868	0.002155	0.002145	0.002259	0.002244	0.001887	0.001290	0.000810	0.002259
6_H2	0.002045	0.002625	0.002641	0.002676	0.002579	0.002143	0.001429	0.000909	0.002676
7_H1	0.001548	0.001753	0.001928	0.001836	0.001626	0.001331	0.001000	0.000691	0.001928
7_H2	0.001882	0.002028	0.002051	0.001968	0.001923	0.001483	0.001061	0.000714	0.002051
8_H1	0.002155	0.002030	0.002210	0.002095	0.001926	0.001751	0.001469	0.000998	0.002210
8_H2	0.001998	0.002566	0.002690	0.002816	0.002775	0.002374	0.001698	0.001017	0.002816
9_H1	0.002486	0.003360	0.003545	0.003624	0.003348	0.002635	0.001778	0.001139	0.003624
9_H2	0.002470	0.003200	0.003276	0.003484	0.003471	0.002896	0.002110	0.001460	0.003484
10_H1	0.002876	0.003118	0.003105	0.003482	0.003569	0.002973	0.002318	0.001642	0.003569
10_H2	0.002889	0.003106	0.003388	0.003696	0.003724	0.003417	0.002755	0.001814	0.003724
11_H1	0.002467	0.002518	0.002342	0.002631	0.002735	0.002132	0.001665	0.001255	0.002735
11_H2	0.002632	0.002329	0.002043	0.002233	0.002282	0.001884	0.001417	0.000997	0.002632

Min	0.001509	0.001753	0.001928	0.001836	0.001626	0.001331	0.001000	0.000691	0.001928
Max	0.003488	0.003360	0.003545	0.003696	0.003724	0.003417	0.002755	0.001814	0.003724
Mean	0.002237	0.002474	0.002521	0.002621	0.002586	0.002160	0.001585	0.001072	0.002725
σ	0.000474	0.000464	0.000483	0.000564	0.000594	0.000523	0.000424	0.000284	0.000547
Mean- σ	0.001763	0.002010	0.002038	0.002057	0.001992	0.001637	0.001161	0.000789	0.002178
Mean+ σ	0.002711	0.002938	0.003004	0.003185	0.003180	0.002683	0.002008	0.001356	0.003272
Q1	0.001899	0.002155	0.002161	0.002239	0.002191	0.001795	0.001330	0.000865	0.002414
Median	0.002182	0.002355	0.002390	0.002427	0.002525	0.002073	0.001449	0.001028	0.002580
Q3	0.002482	0.002834	0.002696	0.002998	0.002904	0.002518	0.001758	0.001178	0.003089

Table A.58 IDR results (Bldg: Symmetric Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002226	0.002183	0.002419	0.002242	0.002185	0.001777	0.001411	0.001041	0.002419
1_H2	0.001686	0.002113	0.002518	0.002340	0.001990	0.001710	0.001419	0.000989	0.002518
2_H1	0.003459	0.003077	0.002714	0.003128	0.003389	0.002634	0.001658	0.001185	0.003459
2_H2	0.001972	0.002423	0.002385	0.002386	0.002504	0.002179	0.001601	0.001171	0.002504
3_H1	0.002258	0.002904	0.003087	0.003112	0.002875	0.002522	0.001906	0.001188	0.003112
3_H2	0.001523	0.002022	0.002338	0.002569	0.002587	0.002391	0.001926	0.001236	0.002587
4_H1	0.002517	0.002163	0.002057	0.002198	0.002413	0.001924	0.001357	0.001071	0.002517
4_H2	0.002047	0.002165	0.002424	0.002392	0.002174	0.001787	0.001292	0.000815	0.002424
5_H1	0.001794	0.002043	0.001930	0.002017	0.001985	0.001653	0.001117	0.000792	0.002043
5_H2	0.002344	0.002396	0.002212	0.002433	0.002482	0.002001	0.001217	0.000860	0.002482
6_H1	0.002030	0.002609	0.002632	0.002667	0.002535	0.002124	0.001448	0.000921	0.002667
6_H2	0.001824	0.002138	0.002132	0.002246	0.002226	0.001873	0.001280	0.000850	0.002246
7_H1	0.001878	0.002026	0.002062	0.001943	0.001899	0.001468	0.001043	0.000710	0.002062
7_H2	0.001554	0.001757	0.001908	0.001797	0.001585	0.001312	0.001012	0.000714	0.001908
8_H1	0.001990	0.002562	0.002694	0.002819	0.002773	0.002377	0.001705	0.001027	0.002819
8_H2	0.002144	0.002013	0.002190	0.002089	0.001922	0.001728	0.001432	0.000987	0.002190
9_H1	0.002461	0.003187	0.003260	0.003440	0.003442	0.002900	0.002054	0.001404	0.003442
9_H2	0.002513	0.003364	0.003525	0.003585	0.003307	0.002622	0.001753	0.001157	0.003585
10_H1	0.002939	0.003143	0.003376	0.003707	0.003756	0.003404	0.002635	0.001668	0.003756
10_H2	0.002798	0.003077	0.003079	0.003439	0.003559	0.002983	0.002357	0.001687	0.003559
11_H1	0.002632	0.002322	0.002055	0.002215	0.002291	0.001871	0.001485	0.000980	0.002632
11_H2	0.002364	0.002386	0.002385	0.002557	0.002644	0.002130	0.002008	0.001602	0.002644

Min	0.001523	0.001757	0.001908	0.001797	0.001585	0.001312	0.001012	0.000710	0.001908
Max	0.003459	0.003364	0.003525	0.003707	0.003756	0.003404	0.002635	0.001687	0.003756
Mean	0.002225	0.002458	0.002517	0.002606	0.002569	0.002153	0.001596	0.001093	0.002708
σ	0.000472	0.000466	0.000479	0.000562	0.000600	0.000526	0.000419	0.000287	0.000544
Mean-σ	0.001753	0.001992	0.002039	0.002044	0.001969	0.001627	0.001178	0.000806	0.002164
Mean+σ	0.002697	0.002924	0.002996	0.003167	0.003169	0.002680	0.002015	0.001381	0.003252
Q1	0.001902	0.002119	0.002147	0.002222	0.002177	0.001780	0.001308	0.000875	0.002420
Median	0.002185	0.002354	0.002402	0.002413	0.002493	0.002063	0.001467	0.001034	0.002553
Q3	0.002500	0.002830	0.002709	0.003039	0.002850	0.002489	0.001868	0.001187	0.003039

Table A.59 IDR results (Bldg: Symmetric Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002278	0.002896	0.003240	0.003383	0.003276	0.002869	0.002204	0.001404	0.003383
1_H2	0.003426	0.002868	0.002793	0.003031	0.003033	0.002480	0.001609	0.000976	0.003426
2_H1	0.003682	0.003048	0.002345	0.002823	0.003172	0.002453	0.001499	0.001205	0.003682
2_H2	0.001983	0.002247	0.002540	0.002442	0.002190	0.001875	0.001481	0.000972	0.002540
3_H1	0.003880	0.002790	0.002145	0.002449	0.002955	0.002265	0.001336	0.001226	0.003880
3_H2	0.002046	0.001960	0.001900	0.001821	0.001920	0.001519	0.001014	0.000745	0.002046
4_H1	0.002717	0.002960	0.003651	0.003887	0.003748	0.003302	0.002563	0.001662	0.003887
4_H2	0.002610	0.003727	0.004226	0.004449	0.004179	0.003389	0.002761	0.001881	0.004449
5_H1	0.003126	0.002361	0.002668	0.002726	0.002608	0.002204	0.001726	0.001377	0.003126
5_H2	0.003192	0.002764	0.002294	0.002702	0.002897	0.002153	0.001628	0.001016	0.003192
6_H1	0.002127	0.002054	0.001794	0.001992	0.002073	0.001668	0.001111	0.000725	0.002127
6_H2	0.003557	0.002727	0.001892	0.002369	0.002728	0.002048	0.000927	0.000886	0.003557
7_H1	0.002223	0.002225	0.001985	0.002017	0.002048	0.001595	0.001131	0.000779	0.002225
7_H2	0.003483	0.002563	0.001987	0.002357	0.002719	0.002059	0.001289	0.000963	0.003483
8_H1	0.002347	0.002217	0.002365	0.002306	0.002341	0.001906	0.001533	0.001075	0.002365
8_H2	0.002522	0.002203	0.001911	0.002041	0.002228	0.001755	0.001049	0.000722	0.002522
9_H1	0.002752	0.002836	0.002881	0.003229	0.003261	0.002811	0.002058	0.001277	0.003261
9_H2	0.003299	0.003475	0.003910	0.004024	0.003866	0.003422	0.002648	0.001648	0.004024
10_H1	0.002020	0.002240	0.002438	0.002544	0.002487	0.002144	0.001625	0.001045	0.002544
10_H2	0.002520	0.003550	0.004527	0.005016	0.005289	0.004620	0.003286	0.001932	0.005289
11_H1	0.004122	0.002952	0.003456	0.003707	0.003595	0.003103	0.002301	0.001417	0.004122
11_H2	0.002125	0.002416	0.002428	0.002487	0.002508	0.002269	0.001820	0.001176	0.002508

Min	0.001983	0.001960	0.001794	0.001821	0.001920	0.001519	0.000927	0.000722	0.002046
Max	0.004122	0.003727	0.004527	0.005016	0.005289	0.004620	0.003286	0.001932	0.005289
Mean	0.002820	0.002685	0.002699	0.002900	0.002960	0.002450	0.001755	0.001187	0.003256
σ	0.000669	0.000489	0.000804	0.000855	0.000813	0.000754	0.000639	0.000359	0.000839
Mean- σ	0.002151	0.002196	0.001895	0.002045	0.002147	0.001696	0.001115	0.000828	0.002417
Mean+ σ	0.003488	0.003175	0.003503	0.003755	0.003773	0.003204	0.002394	0.001546	0.004095
Q1	0.002237	0.002242	0.002027	0.002360	0.002378	0.001942	0.001301	0.000965	0.002527
Median	0.002664	0.002746	0.002433	0.002623	0.002813	0.002235	0.001617	0.001126	0.003322
Q3	0.003394	0.002938	0.003150	0.003345	0.003272	0.002855	0.002168	0.001397	0.003831

Table A.60 IDR results (Bldg: Symmetric Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.003452	0.002823	0.002777	0.003030	0.003030	0.002467	0.001599	0.000995	0.003452
1_H2	0.002270	0.002881	0.003228	0.003372	0.003266	0.002854	0.002180	0.001373	0.003372
2_H1	0.001990	0.002240	0.002553	0.002471	0.002218	0.001892	0.001490	0.000992	0.002553
2_H2	0.003688	0.003051	0.002336	0.002802	0.003152	0.002443	0.001520	0.001208	0.003688
3_H1	0.002053	0.001965	0.001886	0.001830	0.001898	0.001507	0.001003	0.000747	0.002053
3_H2	0.003883	0.002787	0.002131	0.002442	0.002942	0.002247	0.001336	0.001199	0.003883
4_H1	0.002681	0.003896	0.004191	0.004226	0.003994	0.003404	0.002481	0.001535	0.004226
4_H2	0.002740	0.003067	0.003668	0.003858	0.003727	0.003345	0.002710	0.001772	0.003858
5_H1	0.003048	0.002716	0.002214	0.002423	0.002588	0.002079	0.001544	0.001104	0.003048
5_H2	0.003094	0.002398	0.002643	0.002604	0.002509	0.002207	0.001833	0.001336	0.003094
6_H1	0.003553	0.002723	0.001905	0.002388	0.002746	0.002064	0.000934	0.000893	0.003553
6_H2	0.002143	0.002049	0.001784	0.002004	0.002084	0.001651	0.001125	0.000737	0.002143
7_H1	0.003474	0.002539	0.001971	0.002348	0.002715	0.002042	0.001274	0.000953	0.003474
7_H2	0.002240	0.002233	0.001992	0.002051	0.002081	0.001609	0.001136	0.000803	0.002240
8_H1	0.002518	0.002194	0.001895	0.002064	0.002251	0.001769	0.001078	0.000738	0.002518
8_H2	0.002371	0.002241	0.002378	0.002296	0.002332	0.001916	0.001544	0.001092	0.002378
9_H1	0.003145	0.003466	0.003897	0.003992	0.003849	0.003425	0.002633	0.001641	0.003992
9_H2	0.002669	0.002909	0.002841	0.003051	0.003139	0.002830	0.002272	0.001475	0.003139
10_H1	0.002464	0.003498	0.004555	0.004988	0.005266	0.004623	0.003312	0.001921	0.005266
10_H2	0.002018	0.002250	0.002450	0.002565	0.002508	0.002159	0.001606	0.000995	0.002565
11_H1	0.002100	0.002380	0.002414	0.002474	0.002497	0.002252	0.001838	0.001197	0.002497
11_H2	0.004139	0.002950	0.003472	0.003734	0.003621	0.003116	0.002306	0.001428	0.004139

Min	0.001990	0.001965	0.001784	0.001830	0.001898	0.001507	0.000934	0.000737	0.002053
Max	0.004139	0.003896	0.004555	0.004988	0.005266	0.004623	0.003312	0.001921	0.005266
Mean	0.002806	0.002693	0.002690	0.002864	0.002928	0.002450	0.001762	0.001188	0.003233
σ	0.000663	0.000505	0.000808	0.000830	0.000797	0.000759	0.000638	0.000340	0.000819
Mean- σ	0.002143	0.002188	0.001882	0.002034	0.002131	0.001691	0.001124	0.000848	0.002414
Mean+ σ	0.003469	0.003198	0.003498	0.003694	0.003725	0.003209	0.002399	0.001527	0.004052
Q1	0.002248	0.002243	0.002027	0.002358	0.002373	0.001948	0.001290	0.000963	0.002527
Median	0.002675	0.002720	0.002432	0.002520	0.002731	0.002227	0.001572	0.001151	0.003256
Q3	0.003375	0.002940	0.003131	0.003292	0.003238	0.002848	0.002249	0.001414	0.003816

Table A.61 IDR results (Bldg: T4 Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001794	0.002227	0.002392	0.002348	0.002289	0.001975	0.001493	0.001128	0.002392
1_H2	0.001334	0.002005	0.002234	0.002339	0.002325	0.002124	0.001733	0.001247	0.002339
2_H1	0.001014	0.001539	0.001785	0.001750	0.001624	0.001541	0.001373	0.001047	0.001785
2_H2	0.001666	0.001950	0.001824	0.001813	0.001773	0.001549	0.001172	0.000836	0.001950
3_H1	0.001447	0.002204	0.002441	0.002487	0.002415	0.002200	0.001821	0.001335	0.002487
3_H2	0.001892	0.002462	0.002525	0.002561	0.002447	0.002101	0.001605	0.001139	0.002561
4_H1	0.001486	0.001863	0.002092	0.002042	0.001875	0.001649	0.001355	0.001010	0.002092
4_H2	0.001410	0.001967	0.002315	0.002291	0.002089	0.001833	0.001529	0.001151	0.002315
5_H1	0.001617	0.001860	0.001877	0.001907	0.001869	0.001671	0.001327	0.000945	0.001907
5_H2	0.000722	0.001070	0.001133	0.001100	0.001018	0.000888	0.000718	0.000529	0.001133
6_H1	0.001530	0.002055	0.002149	0.002204	0.002113	0.001818	0.001417	0.001010	0.002204
6_H2	0.002137	0.002929	0.003506	0.003511	0.003237	0.002921	0.002515	0.001907	0.003511
7_H1	0.001446	0.001759	0.001872	0.002090	0.002133	0.001874	0.001687	0.001309	0.002133
7_H2	0.001514	0.002180	0.002535	0.002809	0.002909	0.002822	0.002464	0.001839	0.002909
8_H1	0.001702	0.002452	0.003095	0.003590	0.003774	0.003539	0.002914	0.002059	0.003774
8_H2	0.002151	0.003148	0.003523	0.003641	0.003525	0.003228	0.002733	0.002028	0.003641
9_H1	0.001600	0.002265	0.002505	0.002517	0.002370	0.002075	0.001663	0.001213	0.002517
9_H2	0.001390	0.001955	0.002002	0.001901	0.001705	0.001427	0.001118	0.000809	0.002002
10_H1	0.001779	0.001824	0.002002	0.001862	0.001809	0.001578	0.001265	0.001024	0.002002
10_H2	0.001191	0.001558	0.001732	0.001624	0.001481	0.001259	0.001092	0.000853	0.001732
11_H1	0.001714	0.002008	0.002237	0.002060	0.002044	0.001786	0.001357	0.001036	0.002237
11_H2	0.001307	0.001692	0.001875	0.001856	0.001701	0.001457	0.001156	0.000839	0.001875

Min	0.000722	0.001070	0.001133	0.001100	0.001018	0.000888	0.000718	0.000529	0.001133
Max	0.002151	0.003148	0.003523	0.003641	0.003774	0.003539	0.002914	0.002059	0.003774
Mean	0.001538	0.002044	0.002257	0.002287	0.002206	0.001969	0.001614	0.001195	0.002341
σ	0.000330	0.000450	0.000564	0.000642	0.000666	0.000648	0.000566	0.000413	0.000640
Mean- σ	0.001209	0.001594	0.001692	0.001645	0.001540	0.001321	0.001048	0.000782	0.001701
Mean+ σ	0.001868	0.002494	0.002821	0.002928	0.002871	0.002616	0.002180	0.001608	0.002981
Q1	0.001395	0.001833	0.001876	0.001872	0.001782	0.001556	0.001281	0.000961	0.001963
Median	0.001522	0.001986	0.002192	0.002147	0.002101	0.001826	0.001455	0.001088	0.002221
Q3	0.001711	0.002221	0.002489	0.002510	0.002404	0.002118	0.001722	0.001294	0.002510

Table A.62 IDR results (Bldg: T4 Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001368	0.001861	0.002102	0.002239	0.002191	0.001960	0.001567	0.001079	0.002239
1_H2	0.001694	0.001917	0.002167	0.002065	0.001960	0.001613	0.001321	0.000989	0.002167
2_H1	0.001630	0.001841	0.001711	0.001753	0.001721	0.001465	0.001091	0.000767	0.001841
2_H2	0.001033	0.001494	0.001547	0.001351	0.001231	0.001155	0.001041	0.000770	0.001547
3_H1	0.001657	0.001957	0.002101	0.002067	0.001985	0.001703	0.001275	0.000863	0.002101
3_H2	0.001298	0.001936	0.002088	0.002075	0.001990	0.001767	0.001382	0.000922	0.002088
4_H1	0.001403	0.001792	0.002053	0.001965	0.001790	0.001581	0.001248	0.000922	0.002053
4_H2	0.001524	0.001795	0.002036	0.001982	0.001811	0.001569	0.001241	0.000872	0.002036
5_H1	0.000689	0.000965	0.000946	0.000914	0.000825	0.000675	0.000511	0.000353	0.000965
5_H2	0.001740	0.001723	0.001591	0.001724	0.001861	0.001568	0.001016	0.000641	0.001861
6_H1	0.001828	0.002368	0.002865	0.003018	0.002920	0.002700	0.002282	0.001619	0.003018
6_H2	0.001442	0.001853	0.002098	0.002167	0.002059	0.001838	0.001487	0.001033	0.002167
7_H1	0.001503	0.002110	0.002419	0.002491	0.002404	0.002244	0.001897	0.001331	0.002491
7_H2	0.001456	0.001774	0.001888	0.002090	0.002091	0.001811	0.001597	0.001165	0.002091
8_H1	0.002124	0.002745	0.003134	0.003339	0.003334	0.003085	0.002543	0.001763	0.003339
8_H2	0.001696	0.002125	0.002849	0.003343	0.003431	0.003068	0.002393	0.001684	0.003431
9_H1	0.001249	0.001578	0.001595	0.001532	0.001427	0.001182	0.000850	0.000562	0.001595
9_H2	0.001572	0.002154	0.002329	0.002418	0.002316	0.001955	0.001429	0.000933	0.002418
10_H1	0.001344	0.001448	0.001385	0.001455	0.001479	0.001190	0.000751	0.000557	0.001479
10_H2	0.001764	0.001822	0.001778	0.001730	0.001756	0.001430	0.000990	0.000776	0.001822
11_H1	0.001325	0.001736	0.001771	0.001760	0.001668	0.001418	0.001038	0.000663	0.001771
11_H2	0.001670	0.001866	0.001832	0.001837	0.001846	0.001545	0.001097	0.000874	0.001866

Min	0.000689	0.000965	0.000946	0.000914	0.000825	0.000675	0.000511	0.000353	0.000965
Max	0.002124	0.002745	0.003134	0.003343	0.003431	0.003085	0.002543	0.001763	0.003431
Mean	0.001500	0.001857	0.002013	0.002060	0.002004	0.001751	0.001366	0.000961	0.002108
σ	0.000296	0.000346	0.000505	0.000597	0.000614	0.000592	0.000522	0.000366	0.000579
Mean- σ	0.001204	0.001511	0.001508	0.001463	0.001390	0.001159	0.000844	0.000595	0.001530
Mean+ σ	0.001797	0.002203	0.002518	0.002657	0.002619	0.002343	0.001887	0.001327	0.002687
Q1	0.001350	0.001746	0.001726	0.001736	0.001730	0.001439	0.001039	0.000768	0.001827
Median	0.001514	0.001847	0.002045	0.002024	0.001911	0.001597	0.001262	0.000898	0.002071
Q3	0.001688	0.001952	0.002151	0.002221	0.002166	0.001926	0.001547	0.001068	0.002221

Table A.63 IDR results (Bldg: T4 Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001938	0.002534	0.002647	0.002653	0.002447	0.002149	0.001789	0.001344	0.002653
1_H2	0.002155	0.002624	0.002794	0.002894	0.002809	0.002438	0.001875	0.001375	0.002894
2_H1	0.001938	0.002547	0.002797	0.002852	0.002870	0.002589	0.002051	0.001440	0.002870
2_H2	0.003379	0.002962	0.002992	0.003027	0.003019	0.002406	0.001798	0.001236	0.003379
3_H1	0.001817	0.002627	0.002941	0.002934	0.002896	0.002660	0.002207	0.001617	0.002941
3_H2	0.002492	0.003384	0.003753	0.003848	0.003797	0.003380	0.002655	0.001855	0.003848
4_H1	0.002152	0.002462	0.002678	0.002832	0.002749	0.002378	0.001824	0.001271	0.002832
4_H2	0.002425	0.002424	0.002356	0.002623	0.002823	0.002405	0.001704	0.001367	0.002823
5_H1	0.002376	0.002612	0.002564	0.002735	0.002781	0.002430	0.001793	0.001193	0.002781
5_H2	0.001723	0.002065	0.002198	0.002124	0.002058	0.001819	0.001429	0.001012	0.002198
6_H1	0.002049	0.002812	0.003025	0.003177	0.003146	0.002803	0.002200	0.001541	0.003177
6_H2	0.001975	0.002707	0.003009	0.003101	0.002991	0.002652	0.002120	0.001518	0.003101
7_H1	0.001559	0.002041	0.002190	0.002131	0.001969	0.001724	0.001395	0.001020	0.002190
7_H2	0.001828	0.002138	0.002275	0.002320	0.002249	0.002006	0.001607	0.001152	0.002320
8_H1	0.002250	0.002333	0.002224	0.002186	0.002177	0.001964	0.001585	0.001175	0.002333
8_H2	0.002082	0.002903	0.003219	0.003399	0.003316	0.002894	0.002248	0.001586	0.003399
9_H1	0.002743	0.003685	0.003964	0.004167	0.004086	0.003632	0.002881	0.002027	0.004167
9_H2	0.002669	0.003406	0.003692	0.003832	0.003843	0.003417	0.002753	0.002083	0.003843
10_H1	0.002803	0.003288	0.003213	0.003409	0.003486	0.003143	0.002467	0.001821	0.003486
10_H2	0.003378	0.004077	0.004490	0.004658	0.004559	0.004251	0.003637	0.002717	0.004658
11_H1	0.002667	0.003033	0.003038	0.003118	0.003048	0.002651	0.002061	0.001574	0.003118
11_H2	0.002635	0.002583	0.002529	0.002542	0.002596	0.002272	0.001759	0.001309	0.002635

Min	0.001559	0.002041	0.002190	0.002124	0.001969	0.001724	0.001395	0.001012	0.002190
Max	0.003379	0.004077	0.004490	0.004658	0.004559	0.004251	0.003637	0.002717	0.004658
Mean	0.002320	0.002784	0.002936	0.003026	0.002987	0.002639	0.002084	0.001511	0.003075
σ	0.000491	0.000524	0.000608	0.000660	0.000661	0.000621	0.000535	0.000400	0.000640
Mean- σ	0.001828	0.002260	0.002328	0.002366	0.002326	0.002019	0.001548	0.001110	0.002434
Mean+ σ	0.002811	0.003308	0.003544	0.003685	0.003648	0.003260	0.002619	0.001911	0.003715
Q1	0.001947	0.002480	0.002538	0.002631	0.002634	0.002299	0.001767	0.001245	0.002685
Median	0.002203	0.002626	0.002869	0.002914	0.002883	0.002514	0.001963	0.001408	0.002918
Q3	0.002659	0.003015	0.003169	0.003344	0.003274	0.002871	0.002238	0.001609	0.003394

Table A.64 IDR results (Bldg: T4 Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002265	0.002327	0.002537	0.002493	0.002475	0.002088	0.001569	0.001230	0.002537
1_H2	0.001883	0.002162	0.002564	0.002462	0.002199	0.001938	0.001608	0.001142	0.002564
2_H1	0.003461	0.003007	0.002946	0.003046	0.003160	0.002408	0.001761	0.001234	0.003461
2_H2	0.002051	0.002606	0.002645	0.002720	0.002627	0.002335	0.001682	0.001228	0.002720
3_H1	0.002394	0.003050	0.003350	0.003510	0.003353	0.002874	0.002230	0.001531	0.003510
3_H2	0.001682	0.002506	0.002630	0.002658	0.002595	0.002322	0.001916	0.001312	0.002658
4_H1	0.002561	0.002185	0.002070	0.002385	0.002667	0.002119	0.001401	0.001159	0.002667
4_H2	0.002162	0.002273	0.002413	0.002318	0.002211	0.001775	0.001353	0.000928	0.002413
5_H1	0.001795	0.002040	0.002082	0.002218	0.002195	0.001865	0.001337	0.000845	0.002218
5_H2	0.002470	0.002482	0.002298	0.002569	0.002691	0.002250	0.001452	0.000953	0.002691
6_H1	0.001882	0.002450	0.002641	0.002615	0.002530	0.002153	0.001548	0.001069	0.002641
6_H2	0.002015	0.002418	0.002516	0.002598	0.002606	0.002247	0.001588	0.001040	0.002606
7_H1	0.001815	0.001959	0.002061	0.002101	0.002038	0.001795	0.001375	0.000899	0.002101
7_H2	0.001678	0.001840	0.001957	0.001855	0.001689	0.001450	0.001112	0.000757	0.001957
8_H1	0.001900	0.002456	0.002723	0.002970	0.002959	0.002556	0.001891	0.001232	0.002970
8_H2	0.002104	0.002161	0.002279	0.002207	0.002011	0.001768	0.001447	0.001081	0.002279
9_H1	0.002556	0.003258	0.003470	0.003670	0.003558	0.002968	0.002292	0.001648	0.003670
9_H2	0.002388	0.003361	0.003632	0.003716	0.003472	0.002814	0.002106	0.001431	0.003716
10_H1	0.002930	0.003339	0.003893	0.004121	0.004217	0.003991	0.003280	0.002197	0.004217
10_H2	0.002889	0.003004	0.003153	0.003419	0.003455	0.002982	0.002271	0.001551	0.003455
11_H1	0.002737	0.002358	0.002309	0.002310	0.002312	0.001979	0.001595	0.001093	0.002737
11_H2	0.002351	0.002348	0.002444	0.002689	0.002734	0.002289	0.002126	0.001668	0.002734

Min	0.001678	0.001840	0.001957	0.001855	0.001689	0.001450	0.001112	0.000757	0.001957
Max	0.003461	0.003361	0.003893	0.004121	0.004217	0.003991	0.003280	0.002197	0.004217
Mean	0.002271	0.002527	0.002664	0.002757	0.002716	0.002317	0.001770	0.001238	0.002842
σ	0.000459	0.000449	0.000535	0.000592	0.000611	0.000556	0.000477	0.000331	0.000585
Mean- σ	0.001813	0.002078	0.002129	0.002164	0.002105	0.001760	0.001293	0.000906	0.002257
Mean+ σ	0.002730	0.002976	0.003199	0.003349	0.003327	0.002873	0.002247	0.001569	0.003426
Q1	0.001887	0.002207	0.002301	0.002335	0.002236	0.001948	0.001448	0.001047	0.002544
Median	0.002214	0.002434	0.002551	0.002607	0.002617	0.002249	0.001602	0.001194	0.002679
Q3	0.002535	0.002905	0.002890	0.003027	0.003110	0.002519	0.002059	0.001401	0.003334

Table A.65 IDR results (Bldg: T4 Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002563	0.003676	0.004082	0.004186	0.004010	0.003548	0.002854	0.002061	0.004186
1_H2	0.003381	0.003525	0.003524	0.003705	0.003680	0.003169	0.002332	0.001561	0.003705
2_H1	0.003793	0.003636	0.003092	0.003485	0.003772	0.003217	0.002104	0.001743	0.003793
2_H2	0.001897	0.002204	0.002611	0.002451	0.002361	0.002122	0.001632	0.001280	0.002611
3_H1	0.003690	0.002844	0.002546	0.002560	0.002995	0.002572	0.001646	0.001302	0.003690
3_H2	0.002060	0.002185	0.002268	0.002190	0.002196	0.001881	0.001459	0.001187	0.002268
4_H1	0.002826	0.003291	0.003639	0.003721	0.003718	0.003383	0.002985	0.002342	0.003721
4_H2	0.002608	0.003550	0.003774	0.004114	0.003856	0.003152	0.003078	0.002474	0.004114
5_H1	0.003035	0.002887	0.003426	0.003516	0.003359	0.003044	0.002552	0.001891	0.003516
5_H2	0.003066	0.002652	0.002598	0.002754	0.002857	0.002538	0.002112	0.001540	0.003066
6_H1	0.002301	0.002409	0.002146	0.002281	0.002325	0.001946	0.001463	0.001065	0.002409
6_H2	0.003331	0.002806	0.002373	0.002570	0.002812	0.002341	0.001428	0.000971	0.003331
7_H1	0.002627	0.002951	0.002758	0.002880	0.002910	0.002505	0.001795	0.001161	0.002951
7_H2	0.003332	0.002993	0.002528	0.002814	0.002998	0.002492	0.001604	0.001204	0.003332
8_H1	0.002211	0.002720	0.003072	0.003125	0.003030	0.002677	0.002356	0.001811	0.003125
8_H2	0.002352	0.002326	0.002428	0.002453	0.002477	0.002103	0.001585	0.001124	0.002477
9_H1	0.003105	0.003813	0.003929	0.004164	0.004174	0.003746	0.002971	0.002096	0.004174
9_H2	0.003186	0.003554	0.004119	0.004644	0.004897	0.004666	0.003904	0.002817	0.004897
10_H1	0.002074	0.002870	0.003416	0.003445	0.003325	0.003061	0.002454	0.001788	0.003445
10_H2	0.002634	0.003604	0.004163	0.004697	0.005014	0.004558	0.003534	0.002590	0.005014
11_H1	0.003933	0.003422	0.003576	0.003751	0.003867	0.003478	0.002729	0.001916	0.003933
11_H2	0.002428	0.003045	0.003464	0.003430	0.003139	0.002743	0.002252	0.001663	0.003464

Min	0.001897	0.002185	0.002146	0.002190	0.002196	0.001881	0.001428	0.000971	0.002268
Max	0.003933	0.003813	0.004163	0.004697	0.005014	0.004666	0.003904	0.002817	0.005014
Mean	0.002838	0.003044	0.003161	0.003315	0.003353	0.002952	0.002310	0.001709	0.003510
σ	0.000589	0.000507	0.000657	0.000760	0.000771	0.000754	0.000709	0.000530	0.000730
Mean- σ	0.002249	0.002537	0.002504	0.002555	0.002583	0.002198	0.001601	0.001179	0.002780
Mean+ σ	0.003427	0.003550	0.003817	0.004076	0.004124	0.003706	0.003020	0.002238	0.004240
Q1	0.002371	0.002742	0.002559	0.002616	0.002870	0.002495	0.001636	0.001223	0.003081
Median	0.002730	0.002972	0.003254	0.003438	0.003232	0.002894	0.002292	0.001703	0.003490
Q3	0.003295	0.003544	0.003623	0.003744	0.003835	0.003342	0.002823	0.002025	0.003898

Table A.66 IDR results (Bldg: T4 Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.003544	0.002864	0.002871	0.003269	0.003392	0.002852	0.001917	0.001199	0.003544
1_H2	0.002598	0.003199	0.003627	0.003802	0.003705	0.003303	0.002605	0.001750	0.003802
2_H1	0.001905	0.002440	0.002770	0.002715	0.002479	0.002152	0.001727	0.001197	0.002770
2_H2	0.003654	0.003065	0.002392	0.002914	0.003268	0.002600	0.001624	0.001305	0.003654
3_H1	0.002001	0.001855	0.001911	0.001862	0.001848	0.001586	0.001198	0.000859	0.002001
3_H2	0.004012	0.002923	0.002434	0.002601	0.003193	0.002550	0.001453	0.001301	0.004012
4_H1	0.002639	0.003584	0.003999	0.004189	0.004020	0.003447	0.002729	0.001864	0.004189
4_H2	0.002576	0.003484	0.003960	0.004017	0.003836	0.003538	0.002977	0.002100	0.004017
5_H1	0.002908	0.002532	0.002264	0.002285	0.002436	0.002203	0.001799	0.001193	0.002908
5_H2	0.003083	0.002320	0.002727	0.002814	0.002685	0.002453	0.002056	0.001470	0.003083
6_H1	0.003773	0.002970	0.002171	0.002724	0.003089	0.002348	0.001057	0.001054	0.003773
6_H2	0.002162	0.002121	0.001820	0.002026	0.002154	0.001794	0.001277	0.000873	0.002162
7_H1	0.003653	0.002736	0.002065	0.002444	0.002955	0.002353	0.001290	0.001166	0.003653
7_H2	0.002323	0.002384	0.002363	0.002437	0.002518	0.002011	0.001378	0.000999	0.002518
8_H1	0.002709	0.002347	0.001955	0.002308	0.002534	0.002012	0.001231	0.000964	0.002709
8_H2	0.002224	0.002453	0.002537	0.002813	0.002833	0.002336	0.001911	0.001427	0.002833
9_H1	0.003113	0.003183	0.003602	0.004042	0.004246	0.003942	0.003136	0.002092	0.004246
9_H2	0.002726	0.003204	0.003309	0.003623	0.003728	0.003326	0.002521	0.001670	0.003728
10_H1	0.002519	0.003486	0.004429	0.004885	0.005189	0.004563	0.003318	0.002133	0.005189
10_H2	0.002073	0.002354	0.002766	0.002829	0.002883	0.002623	0.002028	0.001336	0.002883
11_H1	0.002070	0.002510	0.002648	0.002772	0.002822	0.002497	0.002029	0.001381	0.002822
11_H2	0.004130	0.003015	0.003538	0.003798	0.003680	0.003189	0.002416	0.001575	0.004130

Min	0.001905	0.001855	0.001820	0.001862	0.001848	0.001586	0.001057	0.000859	0.002001
Max	0.004130	0.003584	0.004429	0.004885	0.005189	0.004563	0.003318	0.002133	0.005189
Mean	0.002836	0.002774	0.002825	0.003053	0.003159	0.002713	0.001985	0.001405	0.003392
σ	0.000691	0.000475	0.000751	0.000790	0.000773	0.000736	0.000670	0.000390	0.000780
Mean-σ	0.002145	0.002299	0.002075	0.002263	0.002386	0.001977	0.001315	0.001015	0.002612
Mean+σ	0.003527	0.003249	0.003576	0.003843	0.003932	0.003448	0.002655	0.001795	0.004173
Q1	0.002249	0.002398	0.002289	0.002483	0.002572	0.002236	0.001397	0.001173	0.002825
Median	0.002674	0.002800	0.002688	0.002814	0.003022	0.002524	0.001914	0.001321	0.003599
Q3	0.003436	0.003154	0.003481	0.003754	0.003699	0.003275	0.002495	0.001646	0.003960

Table A.67 IDR results (Bldg: U4 Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001361	0.002147	0.002371	0.002301	0.002079	0.001759	0.001374	0.000986	0.002371
1_H2	0.001278	0.002041	0.002291	0.002255	0.001995	0.001780	0.001525	0.001096	0.002291
2_H1	0.001018	0.001616	0.001571	0.001432	0.001242	0.001135	0.001053	0.000801	0.001616
2_H2	0.001327	0.002026	0.002159	0.002034	0.001787	0.001527	0.001267	0.000938	0.002159
3_H1	0.001363	0.002248	0.002498	0.002430	0.002248	0.002019	0.001682	0.001208	0.002498
3_H2	0.001320	0.002080	0.002205	0.002061	0.001862	0.001719	0.001479	0.001081	0.002205
4_H1	0.001203	0.001850	0.002047	0.002046	0.001872	0.001617	0.001294	0.000911	0.002047
4_H2	0.001168	0.001823	0.002014	0.002024	0.001862	0.001596	0.001281	0.000958	0.002024
5_H1	0.001294	0.001949	0.002015	0.001871	0.001681	0.001496	0.001252	0.000912	0.002015
5_H2	0.000777	0.001224	0.001271	0.001232	0.001050	0.000873	0.000756	0.000569	0.001271
6_H1	0.001178	0.001922	0.002120	0.002070	0.001937	0.001804	0.001534	0.001107	0.002120
6_H2	0.001488	0.002504	0.002883	0.003035	0.003010	0.002782	0.002312	0.001621	0.003035
7_H1	0.001253	0.001947	0.002043	0.002193	0.002126	0.001920	0.001700	0.001203	0.002193
7_H2	0.001403	0.002288	0.002692	0.002770	0.002656	0.002508	0.002130	0.001518	0.002770
8_H1	0.001424	0.002239	0.002669	0.003066	0.003129	0.002899	0.002392	0.001652	0.003129
8_H2	0.001787	0.002953	0.003353	0.003495	0.003479	0.003266	0.002755	0.001947	0.003495
9_H1	0.001617	0.002664	0.003096	0.003132	0.002882	0.002442	0.001883	0.001305	0.003132
9_H2	0.001126	0.001879	0.002055	0.001939	0.001790	0.001629	0.001379	0.000998	0.002055
10_H1	0.001391	0.002105	0.002207	0.002188	0.001972	0.001609	0.001243	0.000893	0.002207
10_H2	0.001064	0.001661	0.001764	0.001685	0.001478	0.001204	0.001028	0.000763	0.001764
11_H1	0.001342	0.002076	0.002250	0.002235	0.002053	0.001748	0.001406	0.001032	0.002250
11_H2	0.001163	0.001832	0.001980	0.001962	0.001777	0.001496	0.001232	0.000905	0.001980

Min	0.000777	0.001224	0.001271	0.001232	0.001050	0.000873	0.000756	0.000569	0.001271
Max	0.001787	0.002953	0.003353	0.003495	0.003479	0.003266	0.002755	0.001947	0.003495
Mean	0.001288	0.002049	0.002252	0.002248	0.002089	0.001856	0.001544	0.001109	0.002301
σ	0.000209	0.000363	0.000477	0.000555	0.000604	0.000589	0.000486	0.000327	0.000530
Mean-σ	0.001079	0.001685	0.001776	0.001693	0.001486	0.001266	0.001057	0.000782	0.001771
Mean+σ	0.001497	0.002412	0.002729	0.002803	0.002693	0.002445	0.002030	0.001436	0.002831
Q1	0.001171	0.001857	0.002022	0.001978	0.001788	0.001544	0.001256	0.000911	0.002030
Median	0.001307	0.002034	0.002182	0.002129	0.001955	0.001734	0.001393	0.001015	0.002199
Q3	0.001384	0.002216	0.002466	0.002398	0.002218	0.001994	0.001696	0.001207	0.002466

Table A.68 IDR results (Bldg: U4 Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001164	0.001867	0.002008	0.002155	0.002135	0.001919	0.001505	0.000998	0.002155
1_H2	0.001156	0.001832	0.001911	0.001904	0.001738	0.001455	0.001105	0.000776	0.001911
2_H1	0.001194	0.001818	0.001837	0.001669	0.001463	0.001296	0.001083	0.000756	0.001837
2_H2	0.000847	0.001326	0.001342	0.001295	0.001208	0.001055	0.000816	0.000547	0.001342
3_H1	0.001172	0.001913	0.002047	0.001928	0.001759	0.001526	0.001201	0.000818	0.002047
3_H2	0.001132	0.001888	0.002167	0.002132	0.001898	0.001553	0.001146	0.000766	0.002167
4_H1	0.000931	0.001550	0.001726	0.001673	0.001487	0.001258	0.000964	0.000639	0.001726
4_H2	0.000926	0.001464	0.001556	0.001493	0.001358	0.001193	0.000953	0.000683	0.001556
5_H1	0.000698	0.001095	0.001092	0.001019	0.000863	0.000682	0.000522	0.000386	0.001095
5_H2	0.001120	0.001726	0.001794	0.001672	0.001472	0.001208	0.000905	0.000602	0.001794
6_H1	0.001328	0.002112	0.002243	0.002253	0.002211	0.002031	0.001691	0.001151	0.002253
6_H2	0.001034	0.001774	0.002086	0.002158	0.002054	0.001798	0.001408	0.000952	0.002158
7_H1	0.001302	0.002132	0.002461	0.002592	0.002484	0.002169	0.001668	0.001069	0.002592
7_H2	0.001036	0.001664	0.001886	0.001943	0.001813	0.001660	0.001345	0.000891	0.001943
8_H1	0.001430	0.002309	0.002474	0.002543	0.002548	0.002382	0.001954	0.001275	0.002548
8_H2	0.001258	0.002230	0.002746	0.003001	0.002921	0.002767	0.002228	0.001382	0.003001
9_H1	0.001007	0.001618	0.001762	0.001718	0.001544	0.001305	0.001010	0.000694	0.001762
9_H2	0.001241	0.002022	0.002200	0.002115	0.001933	0.001699	0.001356	0.000912	0.002200
10_H1	0.000935	0.001475	0.001537	0.001409	0.001227	0.001030	0.000788	0.000569	0.001537
10_H2	0.001302	0.001983	0.002027	0.001841	0.001595	0.001348	0.001060	0.000726	0.002027
11_H1	0.001034	0.001654	0.001758	0.001632	0.001439	0.001243	0.001002	0.000694	0.001758
11_H2	0.001168	0.001815	0.001884	0.001738	0.001554	0.001368	0.001113	0.000771	0.001884

Min	0.000698	0.001095	0.001092	0.001019	0.000863	0.000682	0.000522	0.000386	0.001095
Max	0.001430	0.002309	0.002746	0.003001	0.002921	0.002767	0.002228	0.001382	0.003001
Mean	0.001110	0.001785	0.001934	0.001904	0.001759	0.001543	0.001219	0.000821	0.001968
σ	0.000175	0.000296	0.000378	0.000453	0.000488	0.000484	0.000400	0.000242	0.000423
Mean-σ	0.000934	0.001489	0.001556	0.001451	0.001272	0.001059	0.000819	0.000578	0.001545
Mean+σ	0.001285	0.002081	0.002312	0.002356	0.002247	0.002027	0.001620	0.001063	0.002391
Q1	0.001014	0.001627	0.001759	0.001670	0.001465	0.001247	0.000974	0.000686	0.001759
Median	0.001144	0.001817	0.001899	0.001873	0.001667	0.001412	0.001109	0.000769	0.001927
Q3	0.001229	0.001966	0.002147	0.002149	0.002024	0.001773	0.001395	0.000942	0.002165

Table A.69 IDR results (Bldg: U4 Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001601	0.002543	0.002678	0.002523	0.002261	0.001968	0.001738	0.001277	0.002678
1_H2	0.001576	0.002476	0.002773	0.002728	0.002415	0.001950	0.001612	0.001180	0.002773
2_H1	0.001814	0.002967	0.003282	0.003145	0.003084	0.002768	0.002136	0.001404	0.003282
2_H2	0.002375	0.003651	0.003895	0.003701	0.003273	0.002661	0.002036	0.001395	0.003895
3_H1	0.001488	0.002412	0.002601	0.002803	0.002937	0.002786	0.002309	0.001604	0.002937
3_H2	0.002078	0.003449	0.003934	0.003927	0.003595	0.003038	0.002358	0.001701	0.003934
4_H1	0.001607	0.002681	0.003013	0.002961	0.002756	0.002470	0.002042	0.001454	0.003013
4_H2	0.001711	0.002625	0.002821	0.002692	0.002352	0.001902	0.001571	0.001140	0.002821
5_H1	0.001851	0.002891	0.003068	0.002885	0.002587	0.002251	0.001830	0.001303	0.003068
5_H2	0.001454	0.002260	0.002301	0.002152	0.001993	0.001692	0.001316	0.000961	0.002301
6_H1	0.001566	0.002473	0.002649	0.002517	0.002302	0.002063	0.001723	0.001245	0.002649
6_H2	0.001748	0.002879	0.003239	0.003179	0.002922	0.002556	0.002059	0.001446	0.003239
7_H1	0.001314	0.002047	0.002238	0.002165	0.001971	0.001769	0.001501	0.001091	0.002238
7_H2	0.001557	0.002410	0.002462	0.002275	0.002091	0.001823	0.001559	0.001138	0.002462
8_H1	0.001424	0.002203	0.002332	0.002085	0.001863	0.001775	0.001579	0.001156	0.002332
8_H2	0.001667	0.002694	0.003104	0.003247	0.003106	0.002709	0.002113	0.001479	0.003247
9_H1	0.002003	0.003296	0.003696	0.003597	0.003197	0.002706	0.002256	0.001633	0.003696
9_H2	0.002210	0.003527	0.003993	0.004173	0.004017	0.003544	0.002813	0.001962	0.004173
10_H1	0.002233	0.003489	0.003731	0.003660	0.003478	0.003441	0.002945	0.002048	0.003731
10_H2	0.002082	0.003295	0.003785	0.003874	0.003837	0.003788	0.003370	0.002450	0.003874
11_H1	0.001832	0.002701	0.002832	0.003084	0.002774	0.002331	0.002287	0.001802	0.003084
11_H2	0.001815	0.002723	0.002779	0.002482	0.002308	0.002161	0.001845	0.001326	0.002779

Min	0.001314	0.002047	0.002238	0.002085	0.001863	0.001692	0.001316	0.000961	0.002238
Max	0.002375	0.003651	0.003993	0.004173	0.004017	0.003788	0.003370	0.002450	0.004173
Mean	0.001773	0.002804	0.003055	0.002993	0.002778	0.002461	0.002045	0.001463	0.003100
σ	0.000288	0.000465	0.000566	0.000622	0.000622	0.000604	0.000508	0.000358	0.000577
Mean- σ	0.001485	0.002339	0.002489	0.002371	0.002156	0.001857	0.001537	0.001105	0.002523
Mean+ σ	0.002061	0.003270	0.003621	0.003616	0.003400	0.003066	0.002553	0.001822	0.003677
Q1	0.001569	0.002474	0.002656	0.002519	0.002304	0.001955	0.001640	0.001196	0.002702
Median	0.001730	0.002698	0.002923	0.002923	0.002765	0.002401	0.002039	0.001400	0.003041
Q3	0.001965	0.003213	0.003593	0.003510	0.003174	0.002753	0.002279	0.001626	0.003593

Table A.70 IDR results (Bldg: U4 Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001395	0.002182	0.002405	0.002381	0.002192	0.001905	0.001503	0.000969	0.002405
1_H2	0.001201	0.002072	0.002369	0.002324	0.002116	0.001819	0.001428	0.000965	0.002369
2_H1	0.002241	0.003413	0.003534	0.003254	0.002791	0.002248	0.001716	0.001180	0.003534
2_H2	0.001466	0.002365	0.002476	0.002453	0.002448	0.002141	0.001588	0.001091	0.002476
3_H1	0.001595	0.002564	0.002904	0.002906	0.002747	0.002387	0.001841	0.001203	0.002906
3_H2	0.001191	0.001963	0.002327	0.002518	0.002533	0.002276	0.001760	0.001091	0.002533
4_H1	0.001633	0.002531	0.002649	0.002472	0.002158	0.001768	0.001306	0.000828	0.002649
4_H2	0.001292	0.002122	0.002340	0.002251	0.002005	0.001675	0.001265	0.000815	0.002340
5_H1	0.001275	0.002077	0.002267	0.002164	0.001913	0.001614	0.001262	0.000866	0.002267
5_H2	0.001499	0.002370	0.002536	0.002385	0.002091	0.001714	0.001269	0.000829	0.002536
6_H1	0.001542	0.002573	0.002867	0.002779	0.002497	0.002133	0.001650	0.001075	0.002867
6_H2	0.001457	0.002412	0.002711	0.002685	0.002444	0.002051	0.001548	0.001011	0.002711
7_H1	0.001320	0.002091	0.002229	0.002077	0.001785	0.001426	0.001058	0.000691	0.002229
7_H2	0.000997	0.001596	0.001693	0.001603	0.001456	0.001306	0.001022	0.000658	0.001693
8_H1	0.001419	0.002301	0.002567	0.002557	0.002389	0.002090	0.001690	0.001154	0.002567
8_H2	0.001383	0.002060	0.002033	0.001975	0.001835	0.001626	0.001300	0.000884	0.002060
9_H1	0.001772	0.002879	0.003222	0.003237	0.002992	0.002545	0.001971	0.001355	0.003237
9_H2	0.001869	0.003150	0.003580	0.003509	0.003078	0.002471	0.001825	0.001132	0.003580
10_H1	0.001701	0.002652	0.002895	0.002769	0.002697	0.002446	0.001975	0.001345	0.002895
10_H2	0.001705	0.002804	0.003185	0.003238	0.003069	0.002688	0.002237	0.001545	0.003238
11_H1	0.001449	0.002170	0.002182	0.002038	0.001888	0.001678	0.001332	0.000893	0.002182
11_H2	0.001564	0.002398	0.002473	0.002464	0.002245	0.001869	0.001570	0.001225	0.002473

Min	0.000997	0.001596	0.001693	0.001603	0.001456	0.001306	0.001022	0.000658	0.001693
Max	0.002241	0.003413	0.003580	0.003509	0.003078	0.002688	0.002237	0.001545	0.003580
Mean	0.001498	0.002398	0.002611	0.002547	0.002335	0.001994	0.001551	0.001037	0.002625
σ	0.000265	0.000412	0.000471	0.000472	0.000442	0.000380	0.000312	0.000224	0.000470
Mean-σ	0.001233	0.001985	0.002140	0.002075	0.001893	0.001615	0.001239	0.000813	0.002155
Mean+σ	0.001764	0.002810	0.003082	0.003020	0.002777	0.002374	0.001863	0.001260	0.003095
Q1	0.001336	0.002099	0.002330	0.002269	0.002027	0.001687	0.001302	0.000871	0.002347
Median	0.001462	0.002368	0.002506	0.002468	0.002317	0.001978	0.001559	0.001043	0.002535
Q3	0.001624	0.002571	0.002888	0.002777	0.002656	0.002269	0.001749	0.001174	0.002888

Table A.71 IDR results (Bldg: U4 Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.002059	0.003347	0.003847	0.003889	0.003688	0.003345	0.002799	0.002001	0.003889
1_H2	0.002211	0.003207	0.003153	0.002969	0.002688	0.002342	0.001927	0.001389	0.003207
2_H1	0.002499	0.003755	0.003815	0.003420	0.002904	0.002375	0.001847	0.001311	0.003815
2_H2	0.001477	0.002408	0.002726	0.002729	0.002449	0.002006	0.001584	0.001142	0.002729
3_H1	0.002416	0.003472	0.003384	0.003069	0.002651	0.002273	0.001863	0.001354	0.003472
3_H2	0.001407	0.002241	0.002471	0.002404	0.002159	0.001799	0.001369	0.000934	0.002471
4_H1	0.002051	0.003201	0.003930	0.004531	0.004499	0.003849	0.002996	0.002116	0.004531
4_H2	0.002526	0.004132	0.004794	0.004942	0.004532	0.003904	0.003672	0.002844	0.004942
5_H1	0.002094	0.003010	0.003059	0.003148	0.003062	0.002741	0.002217	0.001550	0.003148
5_H2	0.002148	0.003220	0.003257	0.002945	0.002480	0.002424	0.002176	0.001608	0.003257
6_H1	0.001677	0.002576	0.002665	0.002422	0.002100	0.001810	0.001498	0.001090	0.002665
6_H2	0.002537	0.003687	0.003755	0.003447	0.002952	0.002357	0.001792	0.001270	0.003755
7_H1	0.001599	0.002491	0.002667	0.002500	0.002145	0.001703	0.001368	0.001028	0.002667
7_H2	0.002324	0.003363	0.003500	0.003278	0.002854	0.002317	0.001734	0.001184	0.003500
8_H1	0.001728	0.002671	0.003019	0.003106	0.002975	0.002699	0.002291	0.001633	0.003106
8_H2	0.001769	0.002710	0.002894	0.002758	0.002443	0.002027	0.001554	0.001075	0.002894
9_H1	0.002108	0.003414	0.003891	0.003957	0.003731	0.003356	0.002769	0.001955	0.003957
9_H2	0.002122	0.003503	0.004079	0.004297	0.004354	0.004191	0.003604	0.002565	0.004354
10_H1	0.001567	0.002600	0.002992	0.003128	0.003002	0.002649	0.002102	0.001467	0.003128
10_H2	0.002290	0.003779	0.004683	0.005364	0.005481	0.004944	0.003870	0.002580	0.005481
11_H1	0.002529	0.003935	0.004183	0.004020	0.003750	0.003418	0.002740	0.001909	0.004183
11_H2	0.001703	0.002798	0.003191	0.003187	0.002901	0.002457	0.002188	0.001598	0.003191

Min	0.001407	0.002241	0.002471	0.002404	0.002100	0.001703	0.001368	0.000934	0.002471
Max	0.002537	0.004132	0.004794	0.005364	0.005481	0.004944	0.003870	0.002844	0.005481
Mean	0.002038	0.003160	0.003453	0.003432	0.003173	0.002772	0.002271	0.001618	0.003561
σ	0.000367	0.000536	0.000649	0.000806	0.000897	0.000863	0.000750	0.000538	0.000780
Mean-σ	0.001671	0.002624	0.002804	0.002626	0.002276	0.001909	0.001521	0.001080	0.002781
Mean+σ	0.002405	0.003696	0.004101	0.004238	0.004070	0.003635	0.003021	0.002157	0.004341
Q1	0.001709	0.002681	0.002999	0.002951	0.002523	0.002284	0.001749	0.001206	0.003112
Median	0.002101	0.003214	0.003321	0.003168	0.002928	0.002441	0.002139	0.001509	0.003365
Q3	0.002316	0.003495	0.003880	0.003940	0.003720	0.003353	0.002762	0.001944	0.003940

Table A.72 IDR results (Bldg: U4 Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001937	0.002881	0.002978	0.002905	0.002638	0.002213	0.001677	0.001099	0.002978
1_H2	0.001569	0.002737	0.003233	0.003343	0.003152	0.002719	0.002087	0.001356	0.003343
2_H1	0.001328	0.002270	0.002553	0.002496	0.002280	0.001973	0.001549	0.001027	0.002553
2_H2	0.002043	0.003089	0.003163	0.002897	0.002451	0.001920	0.001368	0.000868	0.003163
3_H1	0.001279	0.001974	0.002069	0.001916	0.001635	0.001341	0.001087	0.000750	0.002069
3_H2	0.001971	0.002835	0.002806	0.002505	0.002114	0.001667	0.001196	0.000785	0.002835
4_H1	0.002121	0.003516	0.003934	0.003940	0.003701	0.003242	0.002697	0.001969	0.003940
4_H2	0.001926	0.003187	0.003560	0.003738	0.003646	0.003190	0.002456	0.001655	0.003738
5_H1	0.001836	0.002792	0.002856	0.002625	0.002200	0.001914	0.001573	0.001068	0.002856
5_H2	0.001799	0.002570	0.002650	0.002553	0.002264	0.001845	0.001552	0.001079	0.002650
6_H1	0.002179	0.003124	0.003004	0.002583	0.002122	0.001700	0.001289	0.000862	0.003124
6_H2	0.001326	0.002049	0.002163	0.002012	0.001722	0.001367	0.001011	0.000693	0.002163
7_H1	0.002090	0.003061	0.003050	0.002731	0.002297	0.001807	0.001283	0.000824	0.003061
7_H2	0.001538	0.002367	0.002444	0.002225	0.001900	0.001541	0.001180	0.000809	0.002444
8_H1	0.001550	0.002339	0.002348	0.002099	0.001803	0.001512	0.001180	0.000797	0.002348
8_H2	0.001522	0.002367	0.002499	0.002345	0.002038	0.001672	0.001307	0.000920	0.002499
9_H1	0.001803	0.002887	0.003242	0.003173	0.002961	0.002737	0.002226	0.001457	0.003242
9_H2	0.001517	0.002337	0.002616	0.002716	0.002646	0.002384	0.001968	0.001320	0.002716
10_H1	0.001869	0.003194	0.004058	0.004593	0.004557	0.003904	0.002888	0.001799	0.004593
10_H2	0.001464	0.002458	0.002743	0.002662	0.002401	0.002034	0.001620	0.001086	0.002743
11_H1	0.001474	0.002413	0.002642	0.002537	0.002292	0.001990	0.001584	0.001047	0.002642
11_H2	0.002050	0.002879	0.003083	0.003308	0.003280	0.002941	0.002284	0.001452	0.003308

Min	0.001279	0.001974	0.002069	0.001916	0.001635	0.001341	0.001011	0.000693	0.002069
Max	0.002179	0.003516	0.004058	0.004593	0.004557	0.003904	0.002888	0.001969	0.004593
Mean	0.001736	0.002697	0.002895	0.002814	0.002550	0.002164	0.001685	0.001124	0.002955
σ	0.000286	0.000409	0.000511	0.000653	0.000731	0.000683	0.000541	0.000358	0.000595
Mean-σ	0.001450	0.002288	0.002384	0.002161	0.001819	0.001481	0.001144	0.000765	0.002360
Mean+σ	0.002021	0.003106	0.003406	0.003467	0.003281	0.002847	0.002226	0.001482	0.003550
Q1	0.001518	0.002367	0.002569	0.002498	0.002116	0.001679	0.001285	0.000834	0.002575
Median	0.001801	0.002765	0.002831	0.002644	0.002295	0.001947	0.001563	0.001058	0.002846
Q3	0.001963	0.003018	0.003143	0.003106	0.002882	0.002635	0.002057	0.001347	0.003222

Table A.73 IDR results (Bldg: U4 Group 1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001354	0.002144	0.002301	0.002202	0.001964	0.001665	0.001327	0.000932	0.002301
1_H2	0.001212	0.001979	0.002159	0.002046	0.001959	0.001794	0.001535	0.001096	0.002159
2_H1	0.000910	0.001476	0.001547	0.001434	0.001300	0.001200	0.001016	0.000744	0.001547
2_H2	0.001300	0.002019	0.002078	0.001886	0.001649	0.001460	0.001227	0.000884	0.002078
3_H1	0.001325	0.002199	0.002454	0.002406	0.002226	0.001937	0.001580	0.001117	0.002454
3_H2	0.001299	0.002042	0.002146	0.002052	0.001869	0.001641	0.001370	0.000982	0.002146
4_H1	0.001112	0.001776	0.001969	0.001907	0.001731	0.001519	0.001269	0.000912	0.001969
4_H2	0.001113	0.001788	0.002001	0.001983	0.001806	0.001547	0.001273	0.000908	0.002001
5_H1	0.001173	0.001807	0.001925	0.001846	0.001657	0.001401	0.001131	0.000810	0.001925
5_H2	0.000778	0.001248	0.001300	0.001181	0.001013	0.000839	0.000665	0.000480	0.001300
6_H1	0.001122	0.001863	0.002035	0.001941	0.001810	0.001634	0.001354	0.000958	0.002035
6_H2	0.001472	0.002484	0.002884	0.002975	0.002896	0.002666	0.002248	0.001591	0.002975
7_H1	0.001137	0.001834	0.002006	0.002123	0.002030	0.001831	0.001535	0.001044	0.002123
7_H2	0.001389	0.002284	0.002580	0.002652	0.002636	0.002429	0.002001	0.001393	0.002652
8_H1	0.001331	0.002102	0.002655	0.003077	0.003151	0.002846	0.002245	0.001499	0.003151
8_H2	0.001670	0.002815	0.003250	0.003322	0.003259	0.003014	0.002523	0.001781	0.003322
9_H1	0.001525	0.002512	0.002807	0.002776	0.002553	0.002214	0.001786	0.001249	0.002807
9_H2	0.001057	0.001720	0.001870	0.001773	0.001594	0.001385	0.001141	0.000817	0.001870
10_H1	0.001356	0.002069	0.002159	0.002028	0.001796	0.001518	0.001194	0.000841	0.002159
10_H2	0.001035	0.001645	0.001727	0.001583	0.001384	0.001186	0.000961	0.000686	0.001727
11_H1	0.001325	0.002082	0.002214	0.002126	0.001924	0.001668	0.001372	0.000976	0.002214
11_H2	0.001111	0.001786	0.001925	0.001810	0.001617	0.001394	0.001141	0.000814	0.001925

Min	0.000778	0.001248	0.001300	0.001181	0.001013	0.000839	0.000665	0.000480	0.001300
Max	0.001670	0.002815	0.003250	0.003322	0.003259	0.003014	0.002523	0.001781	0.003322
Mean	0.001232	0.001985	0.002181	0.002142	0.001992	0.001763	0.001450	0.001023	0.002220
σ	0.000204	0.000351	0.000450	0.000534	0.000581	0.000555	0.000459	0.000312	0.000501
Mean- σ	0.001028	0.001634	0.001731	0.001608	0.001411	0.001209	0.000991	0.000712	0.001719
Mean+ σ	0.001436	0.002336	0.002632	0.002676	0.002573	0.002318	0.001909	0.001335	0.002721
Q1	0.001112	0.001787	0.001936	0.001856	0.001651	0.001416	0.001154	0.000823	0.001936
Median	0.001256	0.001999	0.002112	0.002037	0.001840	0.001638	0.001341	0.000945	0.002135
Q3	0.001348	0.002134	0.002416	0.002355	0.002177	0.001911	0.001569	0.001112	0.002416

Table A.74 IDR results (Bldg: U4 Group 1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001166	0.001856	0.001964	0.002134	0.002091	0.001806	0.001363	0.000889	0.002134
1_H2	0.001183	0.001826	0.001883	0.001900	0.001733	0.001415	0.001181	0.000867	0.001900
2_H1	0.001198	0.001800	0.001769	0.001568	0.001406	0.001265	0.001094	0.000767	0.001800
2_H2	0.000817	0.001235	0.001309	0.001260	0.001116	0.000991	0.000819	0.000554	0.001309
3_H1	0.001180	0.001883	0.001956	0.001942	0.001770	0.001470	0.001163	0.000811	0.001956
3_H2	0.001122	0.001839	0.002078	0.002094	0.001885	0.001525	0.001126	0.000776	0.002094
4_H1	0.000915	0.001546	0.001726	0.001711	0.001523	0.001234	0.001016	0.000696	0.001726
4_H2	0.000946	0.001524	0.001582	0.001441	0.001309	0.001226	0.001065	0.000747	0.001582
5_H1	0.000727	0.001120	0.001047	0.001028	0.000869	0.000634	0.000538	0.000431	0.001120
5_H2	0.001082	0.001684	0.001822	0.001762	0.001534	0.001191	0.000855	0.000555	0.001822
6_H1	0.001285	0.002053	0.002234	0.002270	0.002248	0.002144	0.001815	0.001217	0.002270
6_H2	0.000955	0.001636	0.001988	0.002112	0.001992	0.001668	0.001269	0.000831	0.002112
7_H1	0.001268	0.002060	0.002333	0.002486	0.002374	0.002048	0.001559	0.000997	0.002486
7_H2	0.001082	0.001710	0.001843	0.001834	0.001730	0.001612	0.001236	0.000810	0.001843
8_H1	0.001462	0.002336	0.002534	0.002585	0.002569	0.002379	0.001942	0.001277	0.002585
8_H2	0.001173	0.002101	0.002651	0.003008	0.002961	0.002661	0.002136	0.001332	0.003008
9_H1	0.001004	0.001603	0.001649	0.001626	0.001421	0.001113	0.000892	0.000623	0.001649
9_H2	0.001193	0.001907	0.002011	0.001863	0.001675	0.001498	0.001234	0.000845	0.002011
10_H1	0.001039	0.001570	0.001539	0.001332	0.001153	0.001028	0.000860	0.000596	0.001570
10_H2	0.001333	0.001981	0.001938	0.001700	0.001472	0.001287	0.001051	0.000734	0.001981
11_H1	0.001044	0.001657	0.001692	0.001515	0.001334	0.001197	0.001004	0.000692	0.001692
11_H2	0.001189	0.001818	0.001821	0.001662	0.001487	0.001338	0.001126	0.000795	0.001821

Min	0.000727	0.001120	0.001047	0.001028	0.000869	0.000634	0.000538	0.000431	0.001120
Max	0.001462	0.002336	0.002651	0.003008	0.002961	0.002661	0.002136	0.001332	0.003008
Mean	0.001107	0.001761	0.001880	0.001856	0.001711	0.001488	0.001197	0.000811	0.001931
σ	0.000171	0.000277	0.000365	0.000461	0.000503	0.000479	0.000379	0.000229	0.000417
Mean- σ	0.000937	0.001484	0.001516	0.001395	0.001208	0.001009	0.000818	0.000582	0.001514
Mean+ σ	0.001278	0.002039	0.002245	0.002317	0.002215	0.001967	0.001576	0.001040	0.002347
Q1	0.001013	0.001611	0.001701	0.001583	0.001410	0.001204	0.001007	0.000693	0.001701
Median	0.001144	0.001809	0.001863	0.001798	0.001605	0.001377	0.001126	0.000786	0.001872
Q3	0.001192	0.001901	0.002005	0.002108	0.001965	0.001654	0.001261	0.000862	0.002108

Table A.75 IDR results (Bldg: U4 Group 1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001491	0.002405	0.002600	0.002459	0.002144	0.001835	0.001508	0.001068	0.002600
1_H2	0.001471	0.002344	0.002570	0.002474	0.002197	0.001829	0.001442	0.001015	0.002570
2_H1	0.001734	0.002805	0.003034	0.002847	0.002774	0.002554	0.002038	0.001366	0.003034
2_H2	0.002219	0.003353	0.003519	0.003321	0.002929	0.002423	0.001828	0.001274	0.003519
3_H1	0.001315	0.002190	0.002542	0.002833	0.002894	0.002654	0.002135	0.001465	0.002894
3_H2	0.001931	0.003214	0.003660	0.003663	0.003342	0.002815	0.002166	0.001505	0.003663
4_H1	0.001516	0.002490	0.002875	0.002887	0.002642	0.002236	0.001738	0.001194	0.002887
4_H2	0.001768	0.002663	0.002799	0.002645	0.002325	0.001911	0.001459	0.001016	0.002799
5_H1	0.001732	0.002726	0.002945	0.002838	0.002535	0.002126	0.001681	0.001171	0.002945
5_H2	0.001376	0.002172	0.002286	0.002099	0.001868	0.001624	0.001310	0.000921	0.002286
6_H1	0.001539	0.002475	0.002726	0.002661	0.002446	0.002141	0.001725	0.001207	0.002726
6_H2	0.001659	0.002694	0.003035	0.002973	0.002701	0.002322	0.001846	0.001299	0.003035
7_H1	0.001194	0.001884	0.002125	0.002077	0.001883	0.001620	0.001298	0.000909	0.002125
7_H2	0.001442	0.002242	0.002337	0.002181	0.001998	0.001749	0.001424	0.001004	0.002337
8_H1	0.001470	0.002188	0.002183	0.002068	0.001850	0.001699	0.001453	0.001040	0.002188
8_H2	0.001650	0.002703	0.003063	0.003082	0.002904	0.002575	0.002078	0.001444	0.003082
9_H1	0.002013	0.003269	0.003593	0.003430	0.003051	0.002662	0.002179	0.001536	0.003593
9_H2	0.001993	0.003210	0.003701	0.003799	0.003578	0.003086	0.002396	0.001687	0.003799
10_H1	0.002115	0.003325	0.003635	0.003615	0.003380	0.002994	0.002595	0.001822	0.003635
10_H2	0.002128	0.003373	0.003643	0.003726	0.003665	0.003382	0.002832	0.001994	0.003726
11_H1	0.001665	0.002574	0.002760	0.002747	0.002470	0.002282	0.001940	0.001377	0.002760
11_H2	0.001722	0.002582	0.002616	0.002449	0.002184	0.001978	0.001641	0.001157	0.002616

Min	0.001194	0.001884	0.002125	0.002068	0.001850	0.001620	0.001298	0.000909	0.002125
Max	0.002219	0.003373	0.003701	0.003799	0.003665	0.003382	0.002832	0.001994	0.003799
Mean	0.001688	0.002676	0.002920	0.002858	0.002625	0.002295	0.001851	0.001294	0.002946
σ	0.000281	0.000444	0.000512	0.000548	0.000552	0.000502	0.000418	0.000291	0.000518
Mean- σ	0.001407	0.002233	0.002408	0.002310	0.002073	0.001794	0.001432	0.001003	0.002428
Mean+ σ	0.001969	0.003120	0.003432	0.003406	0.003178	0.002797	0.002269	0.001586	0.003465
Q1	0.001476	0.002359	0.002578	0.002463	0.002187	0.001854	0.001471	0.001047	0.002604
Median	0.001662	0.002623	0.002837	0.002836	0.002589	0.002259	0.001783	0.001241	0.002891
Q3	0.001890	0.003109	0.003405	0.003261	0.002923	0.002634	0.002121	0.001460	0.003410

Table A.76 IDR results (Bldg: U4 Group 1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001360	0.002083	0.002350	0.002357	0.002188	0.001857	0.001546	0.001035	0.002357
1_H2	0.001210	0.001983	0.002203	0.002128	0.001937	0.001696	0.001374	0.000926	0.002203
2_H1	0.002271	0.003335	0.003283	0.002947	0.002571	0.002144	0.001797	0.001269	0.003335
2_H2	0.001492	0.002358	0.002425	0.002277	0.002290	0.002097	0.001654	0.001190	0.002425
3_H1	0.001701	0.002624	0.002941	0.003015	0.002698	0.002292	0.001792	0.001221	0.003015
3_H2	0.001186	0.002025	0.002278	0.002489	0.002463	0.002208	0.001724	0.001092	0.002489
4_H1	0.001691	0.002512	0.002533	0.002311	0.002012	0.001688	0.001328	0.000887	0.002533
4_H2	0.001366	0.002057	0.002163	0.002006	0.001772	0.001538	0.001254	0.000852	0.002163
5_H1	0.001205	0.001963	0.002186	0.002141	0.001900	0.001533	0.001107	0.000768	0.002186
5_H2	0.001440	0.002288	0.002497	0.002413	0.002107	0.001653	0.001155	0.000788	0.002497
6_H1	0.001415	0.002389	0.002725	0.002679	0.002354	0.001933	0.001474	0.001000	0.002725
6_H2	0.001328	0.002207	0.002503	0.002492	0.002231	0.001798	0.001293	0.000844	0.002503
7_H1	0.001231	0.001958	0.002156	0.002085	0.001798	0.001379	0.000971	0.000663	0.002156
7_H2	0.001056	0.001650	0.001654	0.001631	0.001430	0.001250	0.001045	0.000704	0.001654
8_H1	0.001459	0.002344	0.002536	0.002472	0.002316	0.002091	0.001706	0.001179	0.002536
8_H2	0.001426	0.002096	0.001984	0.001977	0.001817	0.001541	0.001172	0.000774	0.002096
9_H1	0.001629	0.002704	0.003155	0.003243	0.002942	0.002345	0.001640	0.001071	0.003243
9_H2	0.001733	0.002928	0.003408	0.003421	0.003004	0.002352	0.001754	0.001107	0.003421
10_H1	0.001808	0.002740	0.002784	0.002849	0.002794	0.002493	0.001961	0.001284	0.002849
10_H2	0.001668	0.002683	0.003061	0.003162	0.002985	0.002562	0.002068	0.001407	0.003162
11_H1	0.001446	0.002108	0.002163	0.002114	0.001958	0.001709	0.001324	0.000902	0.002163
11_H2	0.001801	0.002603	0.002469	0.002606	0.002369	0.001772	0.001528	0.001317	0.002606

Min	0.001056	0.001650	0.001654	0.001631	0.001430	0.001250	0.000971	0.000663	0.001654
Max	0.002271	0.003335	0.003408	0.003421	0.003004	0.002562	0.002068	0.001407	0.003421
Mean	0.001496	0.002347	0.002521	0.002492	0.002270	0.001906	0.001485	0.001013	0.002560
σ	0.000275	0.000390	0.000441	0.000460	0.000433	0.000370	0.000305	0.000216	0.000455
Mean- σ	0.001222	0.001957	0.002079	0.002032	0.001837	0.001536	0.001180	0.000796	0.002105
Mean+ σ	0.001771	0.002737	0.002962	0.002952	0.002703	0.002276	0.001790	0.001229	0.003015
Q1	0.001336	0.002064	0.002190	0.002131	0.001942	0.001662	0.001264	0.000846	0.002190
Median	0.001443	0.002316	0.002483	0.002443	0.002261	0.001828	0.001501	0.001018	0.002500
Q3	0.001685	0.002619	0.002769	0.002807	0.002544	0.002192	0.001720	0.001187	0.002818

Table A.77 IDR results (Bldg: U4 Group 1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001922	0.003219	0.003731	0.003802	0.003595	0.003192	0.002583	0.001797	0.003802
1_H2	0.002104	0.003058	0.003075	0.002954	0.002658	0.002271	0.001805	0.001258	0.003075
2_H1	0.002464	0.003696	0.003787	0.003483	0.002994	0.002423	0.001820	0.001257	0.003787
2_H2	0.001430	0.002259	0.002536	0.002461	0.002217	0.001904	0.001530	0.001077	0.002536
3_H1	0.002261	0.003252	0.003247	0.002967	0.002567	0.002108	0.001637	0.001140	0.003252
3_H2	0.001411	0.002129	0.002178	0.002008	0.001723	0.001422	0.001124	0.000794	0.002178
4_H1	0.001786	0.003079	0.003695	0.003928	0.003851	0.003445	0.002774	0.001915	0.003928
4_H2	0.002298	0.003835	0.004353	0.004308	0.003945	0.003400	0.002808	0.001970	0.004353
5_H1	0.001954	0.002844	0.002982	0.003080	0.002944	0.002641	0.002131	0.001466	0.003080
5_H2	0.001923	0.002921	0.003012	0.002733	0.002620	0.002382	0.001961	0.001385	0.003012
6_H1	0.001628	0.002483	0.002617	0.002433	0.002100	0.001710	0.001344	0.000954	0.002617
6_H2	0.002330	0.003342	0.003298	0.002949	0.002492	0.002025	0.001547	0.001075	0.003342
7_H1	0.001649	0.002541	0.002660	0.002451	0.002106	0.001718	0.001314	0.000907	0.002660
7_H2	0.002204	0.003256	0.003303	0.003035	0.002625	0.002141	0.001643	0.001143	0.003303
8_H1	0.001665	0.002640	0.002878	0.002816	0.002701	0.002415	0.001969	0.001368	0.002878
8_H2	0.001733	0.002631	0.002750	0.002587	0.002290	0.001931	0.001527	0.001068	0.002750
9_H1	0.002030	0.003260	0.003628	0.003593	0.003404	0.003056	0.002580	0.001825	0.003628
9_H2	0.002039	0.003302	0.003868	0.004107	0.004112	0.003823	0.003209	0.002254	0.004112
10_H1	0.001569	0.002574	0.002907	0.002943	0.002786	0.002469	0.002020	0.001417	0.002943
10_H2	0.002135	0.003539	0.004195	0.004891	0.005017	0.004456	0.003425	0.002253	0.005017
11_H1	0.002300	0.003573	0.003811	0.003686	0.003391	0.003110	0.002548	0.001752	0.003811
11_H2	0.001735	0.002799	0.003113	0.003058	0.002779	0.002393	0.001974	0.001410	0.003113

Min	0.001411	0.002129	0.002178	0.002008	0.001723	0.001422	0.001124	0.000794	0.002178
Max	0.002464	0.003835	0.004353	0.004891	0.005017	0.004456	0.003425	0.002254	0.005017
Mean	0.001935	0.003011	0.003256	0.003194	0.002951	0.002565	0.002058	0.001431	0.003326
σ	0.000307	0.000466	0.000567	0.000705	0.000785	0.000757	0.000629	0.000425	0.000673
Mean- σ	0.001628	0.002544	0.002688	0.002489	0.002166	0.001808	0.001429	0.001006	0.002654
Mean+ σ	0.002242	0.003477	0.003823	0.003899	0.003735	0.003322	0.002687	0.001856	0.003999
Q1	0.001682	0.002633	0.002885	0.002754	0.002511	0.002046	0.001570	0.001093	0.002894
Median	0.001939	0.003069	0.003180	0.003001	0.002740	0.002404	0.001965	0.001377	0.003183
Q3	0.002187	0.003292	0.003722	0.003663	0.003401	0.003097	0.002572	0.001786	0.003798

Table A.78 IDR results (Bldg: U4 Group 1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001860	0.002725	0.002857	0.002898	0.002661	0.002199	0.001621	0.001042	0.002898
1_H2	0.001527	0.002685	0.003229	0.003393	0.003213	0.002747	0.002078	0.001332	0.003393
2_H1	0.001281	0.002163	0.002373	0.002264	0.002070	0.001850	0.001508	0.001009	0.002373
2_H2	0.002041	0.003023	0.003110	0.002912	0.002498	0.001928	0.001311	0.000815	0.003110
3_H1	0.001245	0.001883	0.001975	0.001862	0.001590	0.001312	0.001086	0.000755	0.001975
3_H2	0.001973	0.002769	0.002736	0.002549	0.002176	0.001656	0.001189	0.000817	0.002769
4_H1	0.002223	0.003562	0.003750	0.003707	0.003456	0.003153	0.002993	0.002272	0.003750
4_H2	0.001946	0.003089	0.003394	0.003646	0.003515	0.003069	0.002547	0.001770	0.003646
5_H1	0.001721	0.002582	0.002680	0.002549	0.002227	0.001918	0.001521	0.000996	0.002680
5_H2	0.001763	0.002533	0.002507	0.002370	0.002193	0.001874	0.001504	0.000979	0.002533
6_H1	0.002206	0.003039	0.002854	0.002456	0.002063	0.001698	0.001288	0.000867	0.003039
6_H2	0.001273	0.001967	0.002098	0.002008	0.001719	0.001351	0.000980	0.000644	0.002098
7_H1	0.001983	0.002834	0.002856	0.002636	0.002235	0.001697	0.001301	0.000846	0.002856
7_H2	0.001558	0.002372	0.002384	0.002128	0.001827	0.001544	0.001274	0.000870	0.002384
8_H1	0.001549	0.002257	0.002202	0.001945	0.001705	0.001453	0.001159	0.000804	0.002257
8_H2	0.001466	0.002236	0.002374	0.002275	0.001975	0.001581	0.001377	0.000981	0.002374
9_H1	0.001841	0.002663	0.003124	0.003160	0.002930	0.002725	0.002224	0.001463	0.003160
9_H2	0.001555	0.002446	0.002608	0.002845	0.002708	0.002281	0.001886	0.001300	0.002845
10_H1	0.001787	0.003051	0.003845	0.004354	0.004330	0.003741	0.002798	0.001734	0.004354
10_H2	0.001464	0.002256	0.002376	0.002275	0.002128	0.001892	0.001590	0.001109	0.002376
11_H1	0.001499	0.002416	0.002597	0.002503	0.002314	0.002060	0.001650	0.001082	0.002597
11_H2	0.002118	0.002927	0.003028	0.003167	0.003130	0.002853	0.002259	0.001492	0.003167

Min	0.001245	0.001883	0.001975	0.001862	0.001590	0.001312	0.000980	0.000644	0.001975
Max	0.002223	0.003562	0.003845	0.004354	0.004330	0.003741	0.002993	0.002272	0.004354
Mean	0.001722	0.002613	0.002771	0.002723	0.002485	0.002117	0.001688	0.001135	0.002847
σ	0.000300	0.000411	0.000498	0.000638	0.000695	0.000657	0.000565	0.000401	0.000581
Mean- σ	0.001422	0.002202	0.002273	0.002085	0.001790	0.001460	0.001124	0.000734	0.002266
Mean+ σ	0.002022	0.003023	0.003269	0.003360	0.003180	0.002775	0.002253	0.001536	0.003428
Q1	0.001506	0.002286	0.002378	0.002275	0.002065	0.001666	0.001291	0.000851	0.002378
Median	0.001742	0.002623	0.002708	0.002549	0.002231	0.001905	0.001515	0.001003	0.002807
Q3	0.001966	0.002904	0.003090	0.003098	0.002875	0.002614	0.002030	0.001324	0.003148

Table A.79 IDR results (Bldg: U4 Group 5 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001321	0.002128	0.002300	0.002202	0.001978	0.001682	0.001327	0.000935	0.002300
1_H2	0.001189	0.001950	0.002161	0.002066	0.001867	0.001741	0.001491	0.001090	0.002161
2_H1	0.000960	0.001523	0.001568	0.001414	0.001278	0.001183	0.001044	0.000793	0.001568
2_H2	0.001240	0.001990	0.002074	0.001905	0.001656	0.001444	0.001183	0.000855	0.002074
3_H1	0.001347	0.002190	0.002450	0.002405	0.002216	0.001952	0.001614	0.001164	0.002450
3_H2	0.001290	0.001998	0.002116	0.001992	0.001822	0.001638	0.001383	0.001023	0.002116
4_H1	0.001157	0.001758	0.001998	0.001971	0.001802	0.001565	0.001261	0.000896	0.001998
4_H2	0.001157	0.001781	0.001998	0.001987	0.001819	0.001563	0.001239	0.000906	0.001998
5_H1	0.001231	0.001849	0.001958	0.001859	0.001662	0.001427	0.001164	0.000860	0.001958
5_H2	0.000738	0.001197	0.001269	0.001173	0.001000	0.000848	0.000708	0.000544	0.001269
6_H1	0.001153	0.001865	0.002047	0.001936	0.001806	0.001644	0.001387	0.001021	0.002047
6_H2	0.001494	0.002551	0.002925	0.003001	0.002920	0.002685	0.002227	0.001572	0.003001
7_H1	0.001163	0.001830	0.001991	0.002102	0.002004	0.001777	0.001533	0.001095	0.002102
7_H2	0.001394	0.002281	0.002597	0.002634	0.002613	0.002417	0.002013	0.001436	0.002634
8_H1	0.001378	0.002127	0.002650	0.003061	0.003106	0.002878	0.002314	0.001570	0.003106
8_H2	0.001759	0.002895	0.003307	0.003398	0.003325	0.003074	0.002569	0.001812	0.003398
9_H1	0.001527	0.002540	0.002874	0.002844	0.002617	0.002257	0.001780	0.001242	0.002874
9_H2	0.001078	0.001740	0.001900	0.001817	0.001644	0.001445	0.001202	0.000887	0.001900
10_H1	0.001283	0.002012	0.002142	0.002035	0.001808	0.001504	0.001150	0.000819	0.002142
10_H2	0.000992	0.001601	0.001709	0.001587	0.001392	0.001177	0.000920	0.000631	0.001709
11_H1	0.001272	0.002042	0.002203	0.002115	0.001928	0.001671	0.001338	0.000949	0.002203
11_H2	0.001060	0.001747	0.001915	0.001827	0.001632	0.001401	0.001122	0.000799	0.001915

Min	0.000738	0.001197	0.001269	0.001173	0.001000	0.000848	0.000708	0.000544	0.001269
Max	0.001759	0.002895	0.003307	0.003398	0.003325	0.003074	0.002569	0.001812	0.003398
Mean	0.001236	0.001982	0.002189	0.002151	0.001995	0.001772	0.001453	0.001041	0.002224
σ	0.000214	0.000370	0.000465	0.000544	0.000586	0.000564	0.000467	0.000317	0.000511
Mean-σ	0.001022	0.001611	0.001723	0.001607	0.001409	0.001208	0.000986	0.000724	0.001713
Mean+σ	0.001450	0.002352	0.002654	0.002696	0.002581	0.002335	0.001921	0.001358	0.002735
Q1	0.001154	0.001764	0.001966	0.001871	0.001658	0.001444	0.001169	0.000856	0.001968
Median	0.001236	0.001970	0.002095	0.002014	0.001821	0.001641	0.001333	0.000942	0.002109
Q3	0.001341	0.002128	0.002413	0.002354	0.002163	0.001908	0.001594	0.001147	0.002413

Table A.80 IDR results (Bldg: U4 Group 5 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001084	0.001775	0.001917	0.002024	0.002001	0.001832	0.001490	0.001006	0.002024
1_H2	0.001116	0.001782	0.001899	0.001833	0.001663	0.001463	0.001191	0.000821	0.001899
2_H1	0.001130	0.001752	0.001792	0.001627	0.001427	0.001248	0.001019	0.000696	0.001792
2_H2	0.000793	0.001301	0.001335	0.001329	0.001224	0.001034	0.000845	0.000591	0.001335
3_H1	0.001129	0.001849	0.001985	0.001876	0.001714	0.001501	0.001200	0.000806	0.001985
3_H2	0.001121	0.001909	0.002130	0.002057	0.001853	0.001594	0.001245	0.000833	0.002130
4_H1	0.001014	0.001635	0.001753	0.001675	0.001500	0.001275	0.001036	0.000714	0.001753
4_H2	0.000985	0.001524	0.001619	0.001553	0.001405	0.001231	0.000999	0.000674	0.001619
5_H1	0.000658	0.001044	0.001047	0.000963	0.000819	0.000668	0.000511	0.000359	0.001047
5_H2	0.001138	0.001766	0.001830	0.001684	0.001464	0.001233	0.000978	0.000659	0.001830
6_H1	0.001372	0.002178	0.002296	0.002384	0.002350	0.002183	0.001797	0.001188	0.002384
6_H2	0.001003	0.001731	0.002007	0.002051	0.001953	0.001734	0.001379	0.000924	0.002051
7_H1	0.001237	0.002048	0.002400	0.002487	0.002390	0.002146	0.001709	0.001120	0.002487
7_H2	0.001026	0.001649	0.001857	0.001897	0.001753	0.001628	0.001326	0.000868	0.001897
8_H1	0.001479	0.002377	0.002570	0.002629	0.002577	0.002403	0.001985	0.001315	0.002629
8_H2	0.001208	0.002172	0.002714	0.002982	0.002920	0.002717	0.002168	0.001357	0.002982
9_H1	0.000949	0.001542	0.001671	0.001590	0.001405	0.001185	0.000932	0.000633	0.001671
9_H2	0.001141	0.001880	0.002060	0.001977	0.001782	0.001531	0.001205	0.000803	0.002060
10_H1	0.000950	0.001507	0.001582	0.001464	0.001267	0.001043	0.000792	0.000517	0.001582
10_H2	0.001253	0.001922	0.001973	0.001796	0.001547	0.001278	0.000986	0.000663	0.001973
11_H1	0.000984	0.001592	0.001702	0.001589	0.001398	0.001191	0.000945	0.000642	0.001702
11_H2	0.001119	0.001761	0.001850	0.001725	0.001542	0.001331	0.001061	0.000716	0.001850

Min	0.000658	0.001044	0.001047	0.000963	0.000819	0.000668	0.000511	0.000359	0.001047
Max	0.001479	0.002377	0.002714	0.002982	0.002920	0.002717	0.002168	0.001357	0.002982
Mean	0.001086	0.001759	0.001909	0.001872	0.001725	0.001520	0.001218	0.000814	0.001940
σ	0.000177	0.000295	0.000377	0.000450	0.000488	0.000489	0.000403	0.000253	0.000422
Mean- σ	0.000909	0.001464	0.001532	0.001422	0.001237	0.001032	0.000815	0.000561	0.001518
Mean+ σ	0.001263	0.002054	0.002285	0.002323	0.002213	0.002009	0.001621	0.001066	0.002362
Q1	0.000990	0.001603	0.001715	0.001599	0.001411	0.001232	0.000980	0.000660	0.001715
Median	0.001118	0.001764	0.001878	0.001815	0.001605	0.001397	0.001126	0.000760	0.001898
Q3	0.001140	0.001902	0.002047	0.002044	0.001928	0.001708	0.001366	0.000910	0.002058

Table A.81 IDR results (Bldg: U4 Group 5 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001558	0.002470	0.002648	0.002472	0.002166	0.001856	0.001549	0.001145	0.002648
1_H2	0.001539	0.002400	0.002584	0.002454	0.002178	0.001843	0.001510	0.001115	0.002584
2_H1	0.001730	0.002798	0.003098	0.002976	0.002827	0.002591	0.002049	0.001374	0.003098
2_H2	0.002192	0.003384	0.003575	0.003400	0.003031	0.002486	0.001854	0.001239	0.003575
3_H1	0.001428	0.002273	0.002542	0.002759	0.002822	0.002645	0.002189	0.001530	0.002822
3_H2	0.002033	0.003311	0.003736	0.003726	0.003423	0.002918	0.002272	0.001593	0.003736
4_H1	0.001560	0.002559	0.002916	0.002898	0.002666	0.002312	0.001856	0.001326	0.002916
4_H2	0.001727	0.002660	0.002799	0.002629	0.002309	0.001911	0.001458	0.001046	0.002799
5_H1	0.001793	0.002768	0.002974	0.002835	0.002534	0.002162	0.001729	0.001235	0.002974
5_H2	0.001432	0.002189	0.002269	0.002053	0.001883	0.001613	0.001273	0.000905	0.002269
6_H1	0.001580	0.002486	0.002719	0.002637	0.002423	0.002138	0.001746	0.001249	0.002719
6_H2	0.001682	0.002771	0.003128	0.003081	0.002810	0.002415	0.001924	0.001363	0.003128
7_H1	0.001267	0.001946	0.002166	0.002101	0.001907	0.001664	0.001368	0.001000	0.002166
7_H2	0.001504	0.002274	0.002335	0.002211	0.002032	0.001799	0.001488	0.001092	0.002335
8_H1	0.001438	0.002155	0.002206	0.002058	0.001853	0.001711	0.001483	0.001091	0.002206
8_H2	0.001642	0.002687	0.003080	0.003128	0.002955	0.002601	0.002066	0.001444	0.003128
9_H1	0.001990	0.003201	0.003529	0.003397	0.003045	0.002638	0.002159	0.001539	0.003529
9_H2	0.002032	0.003254	0.003710	0.003786	0.003587	0.003152	0.002503	0.001799	0.003786
10_H1	0.002167	0.003367	0.003657	0.003576	0.003325	0.003063	0.002642	0.001860	0.003657
10_H2	0.002126	0.003366	0.003670	0.003776	0.003675	0.003442	0.002992	0.002180	0.003776
11_H1	0.001673	0.002540	0.002730	0.002757	0.002476	0.002312	0.002074	0.001565	0.002757
11_H2	0.001752	0.002604	0.002666	0.002434	0.002180	0.002002	0.001700	0.001230	0.002666

Min	0.001267	0.001946	0.002166	0.002053	0.001853	0.001613	0.001273	0.000905	0.002166
Max	0.002192	0.003384	0.003736	0.003786	0.003675	0.003442	0.002992	0.002180	0.003786
Mean	0.001720	0.002703	0.002943	0.002870	0.002641	0.002331	0.001904	0.001360	0.002967
σ	0.000265	0.000439	0.000517	0.000560	0.000557	0.000516	0.000440	0.000311	0.000523
Mean- σ	0.001455	0.002264	0.002425	0.002310	0.002085	0.001814	0.001464	0.001049	0.002444
Mean+ σ	0.001985	0.003142	0.003460	0.003430	0.003198	0.002847	0.002344	0.001671	0.003490
Q1	0.001544	0.002418	0.002600	0.002459	0.002179	0.001870	0.001520	0.001123	0.002653
Median	0.001678	0.002632	0.002858	0.002797	0.002600	0.002312	0.001855	0.001288	0.002869
Q3	0.001941	0.003100	0.003429	0.003330	0.003012	0.002629	0.002138	0.001537	0.003429

Table A.82 IDR results (Bldg: U4 Group 5 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001417	0.002199	0.002417	0.002342	0.002177	0.001905	0.001518	0.000986	0.002417
1_H2	0.001261	0.002017	0.002254	0.002217	0.002015	0.001716	0.001366	0.000906	0.002254
2_H1	0.002140	0.003270	0.003392	0.003135	0.002693	0.002151	0.001671	0.001123	0.003392
2_H2	0.001390	0.002269	0.002426	0.002405	0.002400	0.002093	0.001564	0.000991	0.002426
3_H1	0.001648	0.002673	0.002972	0.002895	0.002629	0.002302	0.001876	0.001238	0.002972
3_H2	0.001187	0.002025	0.002285	0.002482	0.002476	0.002241	0.001759	0.001119	0.002482
4_H1	0.001654	0.002545	0.002641	0.002443	0.002117	0.001732	0.001293	0.000819	0.002641
4_H2	0.001296	0.002094	0.002318	0.002233	0.001975	0.001626	0.001220	0.000779	0.002318
5_H1	0.001259	0.002052	0.002212	0.002089	0.001848	0.001573	0.001239	0.000829	0.002212
5_H2	0.001506	0.002378	0.002509	0.002334	0.002033	0.001676	0.001266	0.000832	0.002509
6_H1	0.001499	0.002501	0.002747	0.002626	0.002339	0.001993	0.001555	0.001012	0.002747
6_H2	0.001403	0.002310	0.002552	0.002477	0.002232	0.001882	0.001445	0.000967	0.002552
7_H1	0.001298	0.002067	0.002176	0.002015	0.001728	0.001389	0.001080	0.000732	0.002176
7_H2	0.001054	0.001616	0.001690	0.001558	0.001483	0.001303	0.001007	0.000643	0.001690
8_H1	0.001375	0.002331	0.002623	0.002627	0.002454	0.002135	0.001659	0.001085	0.002627
8_H2	0.001360	0.002047	0.002038	0.001930	0.001762	0.001569	0.001274	0.000867	0.002047
9_H1	0.001737	0.002854	0.003163	0.003112	0.002837	0.002405	0.001852	0.001230	0.003163
9_H2	0.001863	0.003132	0.003508	0.003396	0.002990	0.002448	0.001842	0.001156	0.003508
10_H1	0.001710	0.002706	0.002893	0.002726	0.002708	0.002565	0.002148	0.001475	0.002893
10_H2	0.001713	0.002779	0.003101	0.003127	0.002955	0.002603	0.002050	0.001363	0.003127
11_H1	0.001472	0.002192	0.002186	0.002044	0.001915	0.001750	0.001444	0.000971	0.002192
11_H2	0.001507	0.002348	0.002452	0.002393	0.002166	0.001805	0.001521	0.001066	0.002452

Min	0.001054	0.001616	0.001690	0.001558	0.001483	0.001303	0.001007	0.000643	0.001690
Max	0.002140	0.003270	0.003508	0.003396	0.002990	0.002603	0.002148	0.001475	0.003508
Mean	0.001489	0.002382	0.002571	0.002482	0.002270	0.001948	0.001530	0.001009	0.002582
σ	0.000248	0.000397	0.000452	0.000450	0.000416	0.000374	0.000305	0.000207	0.000449
Mean-σ	0.001241	0.001985	0.002119	0.002032	0.001854	0.001574	0.001224	0.000802	0.002133
Mean+σ	0.001736	0.002779	0.003023	0.002932	0.002686	0.002322	0.001835	0.001215	0.003030
Q1	0.001314	0.002074	0.002262	0.002221	0.001985	0.001686	0.001279	0.000841	0.002270
Median	0.001445	0.002321	0.002481	0.002424	0.002205	0.001894	0.001520	0.000989	0.002496
Q3	0.001653	0.002641	0.002857	0.002701	0.002591	0.002219	0.001737	0.001122	0.002857

Table A.83 IDR results (Bldg: U4 Group 5 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001998	0.003290	0.003780	0.003828	0.003618	0.003225	0.002628	0.001856	0.003828
1_H2	0.002186	0.003124	0.003084	0.002968	0.002684	0.002298	0.001838	0.001324	0.003124
2_H1	0.002498	0.003716	0.003819	0.003493	0.002996	0.002443	0.001888	0.001336	0.003819
2_H2	0.001373	0.002215	0.002514	0.002460	0.002215	0.001877	0.001464	0.001037	0.002514
3_H1	0.002351	0.003341	0.003318	0.003005	0.002603	0.002172	0.001711	0.001240	0.003341
3_H2	0.001408	0.002095	0.002169	0.002062	0.001836	0.001538	0.001190	0.000847	0.002169
4_H1	0.002006	0.003246	0.003683	0.004110	0.004058	0.003458	0.002841	0.001949	0.004110
4_H2	0.002370	0.003857	0.004323	0.004361	0.003982	0.003490	0.002988	0.002201	0.004361
5_H1	0.002007	0.002934	0.003008	0.003126	0.002984	0.002670	0.002171	0.001511	0.003126
5_H2	0.002012	0.002982	0.003048	0.002783	0.002603	0.002378	0.002002	0.001471	0.003048
6_H1	0.001662	0.002511	0.002597	0.002375	0.002064	0.001734	0.001383	0.001027	0.002597
6_H2	0.002368	0.003467	0.003471	0.003134	0.002674	0.002165	0.001623	0.001116	0.003471
7_H1	0.001637	0.002514	0.002658	0.002478	0.002150	0.001758	0.001337	0.000967	0.002658
7_H2	0.002252	0.003269	0.003360	0.003102	0.002690	0.002200	0.001665	0.001153	0.003360
8_H1	0.001696	0.002664	0.002925	0.002889	0.002786	0.002530	0.002081	0.001481	0.002925
8_H2	0.001726	0.002653	0.002787	0.002641	0.002340	0.001950	0.001503	0.001049	0.002787
9_H1	0.002029	0.003282	0.003724	0.003799	0.003562	0.003124	0.002619	0.001839	0.003799
9_H2	0.002110	0.003407	0.003966	0.004212	0.004212	0.003929	0.003347	0.002399	0.004212
10_H1	0.001551	0.002534	0.002920	0.002983	0.002828	0.002495	0.001996	0.001401	0.002983
10_H2	0.002207	0.003570	0.004347	0.004990	0.005068	0.004512	0.003484	0.002327	0.005068
11_H1	0.002394	0.003676	0.003936	0.003803	0.003503	0.003125	0.002526	0.001773	0.003936
11_H2	0.001723	0.002748	0.003064	0.003018	0.002750	0.002406	0.002082	0.001525	0.003064

Min	0.001373	0.002095	0.002169	0.002062	0.001836	0.001538	0.001190	0.000847	0.002169
Max	0.002498	0.003857	0.004347	0.004990	0.005068	0.004512	0.003484	0.002399	0.005068
Mean	0.001980	0.003050	0.003296	0.003255	0.003009	0.002613	0.002108	0.001492	0.003377
σ	0.000337	0.000498	0.000596	0.000735	0.000803	0.000761	0.000652	0.000450	0.000701
Mean-σ	0.001644	0.002551	0.002700	0.002520	0.002206	0.001851	0.001456	0.001042	0.002676
Mean+σ	0.002317	0.003548	0.003891	0.003991	0.003812	0.003374	0.002760	0.001942	0.004079
Q1	0.001703	0.002656	0.002921	0.002810	0.002603	0.002167	0.001634	0.001125	0.002940
Median	0.002010	0.003185	0.003201	0.003060	0.002768	0.002425	0.001999	0.001436	0.003234
Q3	0.002241	0.003391	0.003766	0.003802	0.003547	0.003125	0.002596	0.001823	0.003826

Table A.84 IDR results (Bldg: U4 Group 5 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MIDR
1_H1	0.001924	0.002866	0.002923	0.002855	0.002609	0.002247	0.001770	0.001183	0.002923
1_H2	0.001661	0.002836	0.003284	0.003347	0.003177	0.002816	0.002234	0.001467	0.003347
2_H1	0.001244	0.002137	0.002419	0.002375	0.002165	0.001857	0.001446	0.000952	0.002419
2_H2	0.002124	0.003180	0.003220	0.002905	0.002466	0.001983	0.001455	0.000934	0.003220
3_H1	0.001299	0.001986	0.002022	0.001813	0.001543	0.001306	0.001039	0.000724	0.002022
3_H2	0.001994	0.002856	0.002784	0.002471	0.002091	0.001685	0.001253	0.000826	0.002856
4_H1	0.001999	0.003369	0.003842	0.003854	0.003571	0.003126	0.002552	0.001673	0.003854
4_H2	0.001742	0.002990	0.003403	0.003541	0.003425	0.003045	0.002432	0.001688	0.003541
5_H1	0.001762	0.002675	0.002728	0.002457	0.002161	0.001941	0.001571	0.001069	0.002728
5_H2	0.001797	0.002648	0.002606	0.002384	0.002227	0.001928	0.001486	0.000963	0.002648
6_H1	0.002116	0.003034	0.002965	0.002625	0.002188	0.001721	0.001246	0.000797	0.003034
6_H2	0.001341	0.002050	0.002119	0.001942	0.001666	0.001398	0.001130	0.000764	0.002119
7_H1	0.002030	0.002978	0.002948	0.002622	0.002199	0.001742	0.001282	0.000814	0.002978
7_H2	0.001529	0.002376	0.002472	0.002263	0.001929	0.001556	0.001202	0.000801	0.002472
8_H1	0.001461	0.002201	0.002239	0.002048	0.001761	0.001438	0.001102	0.000726	0.002239
8_H2	0.001497	0.002311	0.002403	0.002221	0.001925	0.001696	0.001365	0.000917	0.002403
9_H1	0.001707	0.002765	0.003104	0.003037	0.002961	0.002789	0.002305	0.001530	0.003104
9_H2	0.001487	0.002416	0.002669	0.002658	0.002572	0.002339	0.001919	0.001292	0.002669
10_H1	0.001863	0.003136	0.003932	0.004405	0.004370	0.003784	0.002838	0.001769	0.004405
10_H2	0.001379	0.002312	0.002583	0.002520	0.002267	0.001999	0.001571	0.001035	0.002583
11_H1	0.001436	0.002349	0.002586	0.002518	0.002309	0.002003	0.001575	0.001038	0.002586
11_H2	0.001981	0.002862	0.003021	0.003258	0.003213	0.002857	0.002195	0.001384	0.003258

Min	0.001244	0.001986	0.002022	0.001813	0.001543	0.001306	0.001039	0.000724	0.002022
Max	0.002124	0.003369	0.003932	0.004405	0.004370	0.003784	0.002838	0.001769	0.004405
Mean	0.001699	0.002652	0.002831	0.002733	0.002491	0.002148	0.001680	0.001107	0.002882
σ	0.000281	0.000397	0.000501	0.000634	0.000699	0.000654	0.000524	0.000339	0.000573
Mean- σ	0.001418	0.002255	0.002329	0.002099	0.001792	0.001494	0.001156	0.000768	0.002309
Mean+ σ	0.001979	0.003048	0.003332	0.003366	0.003190	0.002802	0.002205	0.001445	0.003455
Q1	0.001468	0.002321	0.002500	0.002377	0.002109	0.001702	0.001260	0.000817	0.002500
Median	0.001725	0.002720	0.002756	0.002571	0.002247	0.001962	0.001529	0.000999	0.002792
Q3	0.001967	0.002950	0.003083	0.003004	0.002873	0.002677	0.002126	0.001361	0.003191

Table A.85 BSR results (Bldg: Symmetric)

SYM	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.086	0.109	0.100	0.136
1_H2	0.072	0.097	0.109	0.086	0.136	0.100
2_H1	0.070	0.080	0.088	0.130	0.136	0.088
2_H2	0.080	0.070	0.130	0.088	0.088	0.136
3_H1	0.070	0.087	0.076	0.102	0.150	0.095
3_H2	0.087	0.070	0.102	0.076	0.095	0.150
4_H1	0.074	0.074	0.096	0.111	0.110	0.090
4_H2	0.074	0.074	0.111	0.096	0.090	0.110
5_H1	0.084	0.052	0.108	0.079	0.124	0.125
5_H2	0.052	0.084	0.079	0.108	0.125	0.124
6_H1	0.079	0.083	0.085	0.095	0.095	0.139
6_H2	0.083	0.079	0.095	0.085	0.139	0.095
7_H1	0.075	0.068	0.078	0.085	0.097	0.141
7_H2	0.068	0.075	0.085	0.078	0.141	0.097
8_H1	0.077	0.085	0.098	0.095	0.100	0.105
8_H2	0.085	0.077	0.095	0.098	0.105	0.100
9_H1	0.078	0.065	0.099	0.097	0.116	0.129
9_H2	0.065	0.078	0.097	0.099	0.129	0.116
10_H1	0.088	0.075	0.102	0.102	0.096	0.088
10_H2	0.075	0.088	0.102	0.102	0.088	0.096
11_H1	0.091	0.076	0.093	0.110	0.172	0.091
11_H2	0.076	0.091	0.110	0.093	0.091	0.172

Min	0.052	0.052	0.076	0.076	0.088	0.088
Max	0.097	0.097	0.130	0.130	0.172	0.172
Mean	0.077	0.077	0.096	0.096	0.115	0.115
σ	0.010	0.010	0.013	0.013	0.024	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.091	0.091
Mean+σ	0.087	0.087	0.109	0.109	0.138	0.138
Q1	0.072	0.072	0.086	0.086	0.095	0.095
Median	0.077	0.077	0.096	0.096	0.108	0.108
Q3	0.084	0.084	0.102	0.102	0.134	0.134

Table A.86 BSR results (Bldg: T1)

T1	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.071	0.085	0.110	0.101	0.139
1_H2	0.073	0.097	0.108	0.088	0.136	0.098
2_H1	0.070	0.079	0.088	0.131	0.138	0.088
2_H2	0.081	0.070	0.130	0.087	0.089	0.136
3_H1	0.071	0.085	0.077	0.104	0.151	0.095
3_H2	0.088	0.070	0.101	0.077	0.095	0.151
4_H1	0.075	0.075	0.097	0.111	0.108	0.098
4_H2	0.074	0.075	0.111	0.097	0.098	0.109
5_H1	0.085	0.050	0.109	0.079	0.123	0.124
5_H2	0.055	0.084	0.080	0.107	0.127	0.128
6_H1	0.080	0.082	0.087	0.093	0.096	0.142
6_H2	0.084	0.078	0.096	0.084	0.140	0.095
7_H1	0.076	0.069	0.079	0.086	0.097	0.143
7_H2	0.068	0.076	0.084	0.076	0.141	0.096
8_H1	0.076	0.085	0.097	0.097	0.100	0.104
8_H2	0.086	0.075	0.094	0.100	0.107	0.101
9_H1	0.078	0.066	0.099	0.097	0.113	0.130
9_H2	0.066	0.078	0.097	0.099	0.130	0.122
10_H1	0.089	0.077	0.104	0.101	0.096	0.089
10_H2	0.075	0.089	0.104	0.100	0.091	0.097
11_H1	0.092	0.077	0.094	0.109	0.173	0.091
11_H2	0.076	0.091	0.112	0.092	0.092	0.173

Min	0.055	0.050	0.077	0.076	0.089	0.088
Max	0.097	0.097	0.130	0.131	0.173	0.173
Mean	0.078	0.077	0.097	0.097	0.115	0.116
σ	0.010	0.010	0.013	0.013	0.023	0.024
Mean-σ	0.068	0.067	0.084	0.084	0.092	0.092
Mean+σ	0.087	0.087	0.110	0.109	0.139	0.140
Q1	0.073	0.072	0.087	0.087	0.097	0.096
Median	0.076	0.077	0.097	0.097	0.107	0.106
Q3	0.084	0.084	0.104	0.103	0.134	0.135

Table A.87 BSR results (Bldg: T2)

T2	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.085	0.110	0.100	0.138
1_H2	0.072	0.097	0.108	0.087	0.136	0.098
2_H1	0.070	0.079	0.088	0.131	0.137	0.089
2_H2	0.080	0.070	0.130	0.088	0.089	0.136
3_H1	0.070	0.086	0.077	0.103	0.150	0.095
3_H2	0.088	0.070	0.101	0.077	0.095	0.151
4_H1	0.074	0.074	0.096	0.111	0.109	0.095
4_H2	0.074	0.075	0.111	0.097	0.094	0.110
5_H1	0.084	0.051	0.109	0.079	0.123	0.125
5_H2	0.054	0.084	0.080	0.108	0.125	0.127
6_H1	0.080	0.082	0.086	0.095	0.095	0.141
6_H2	0.083	0.078	0.096	0.083	0.139	0.095
7_H1	0.076	0.069	0.079	0.086	0.097	0.143
7_H2	0.068	0.076	0.084	0.077	0.141	0.096
8_H1	0.076	0.085	0.097	0.096	0.099	0.105
8_H2	0.086	0.077	0.095	0.099	0.106	0.101
9_H1	0.078	0.066	0.099	0.097	0.115	0.130
9_H2	0.066	0.078	0.097	0.099	0.129	0.120
10_H1	0.088	0.076	0.103	0.101	0.096	0.087
10_H2	0.075	0.089	0.103	0.101	0.090	0.097
11_H1	0.091	0.077	0.093	0.109	0.172	0.092
11_H2	0.076	0.091	0.111	0.093	0.092	0.173

Min	0.054	0.051	0.077	0.077	0.089	0.087
Max	0.097	0.097	0.130	0.131	0.172	0.173
Mean	0.078	0.077	0.097	0.097	0.115	0.116
σ	0.010	0.010	0.013	0.013	0.023	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.092	0.092
Mean+σ	0.087	0.087	0.109	0.110	0.138	0.139
Q1	0.073	0.072	0.087	0.087	0.096	0.095
Median	0.076	0.077	0.097	0.097	0.108	0.107
Q3	0.084	0.084	0.103	0.103	0.134	0.134

Table A.88 BSR results (Bldg: T3)

T3	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.085	0.109	0.100	0.137
1_H2	0.072	0.097	0.109	0.086	0.136	0.099
2_H1	0.070	0.079	0.088	0.130	0.137	0.088
2_H2	0.080	0.070	0.130	0.088	0.089	0.136
3_H1	0.070	0.086	0.076	0.102	0.150	0.095
3_H2	0.087	0.070	0.102	0.076	0.095	0.151
4_H1	0.074	0.074	0.096	0.111	0.109	0.091
4_H2	0.074	0.074	0.111	0.096	0.091	0.110
5_H1	0.084	0.052	0.108	0.079	0.124	0.125
5_H2	0.053	0.084	0.080	0.108	0.125	0.125
6_H1	0.079	0.082	0.085	0.095	0.095	0.140
6_H2	0.083	0.079	0.095	0.084	0.139	0.095
7_H1	0.076	0.068	0.078	0.085	0.097	0.142
7_H2	0.068	0.076	0.085	0.077	0.141	0.096
8_H1	0.076	0.085	0.098	0.095	0.100	0.105
8_H2	0.086	0.077	0.095	0.098	0.106	0.100
9_H1	0.078	0.066	0.099	0.097	0.116	0.129
9_H2	0.066	0.078	0.097	0.099	0.129	0.118
10_H1	0.088	0.076	0.102	0.102	0.096	0.086
10_H2	0.075	0.088	0.103	0.101	0.088	0.097
11_H1	0.091	0.076	0.093	0.109	0.172	0.092
11_H2	0.076	0.091	0.110	0.093	0.092	0.172

Min	0.053	0.052	0.076	0.076	0.088	0.086
Max	0.097	0.097	0.130	0.130	0.172	0.172
Mean	0.077	0.077	0.097	0.096	0.115	0.115
σ	0.010	0.010	0.013	0.013	0.024	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.091	0.091
Mean+σ	0.087	0.087	0.109	0.109	0.138	0.139
Q1	0.073	0.072	0.086	0.086	0.095	0.095
Median	0.076	0.077	0.097	0.097	0.108	0.108
Q3	0.084	0.084	0.103	0.102	0.135	0.134

Table A.89 BSR results (Bldg: T4)

T4	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.086	0.109	0.099	0.137
1_H2	0.072	0.097	0.109	0.085	0.137	0.100
2_H1	0.070	0.080	0.088	0.130	0.136	0.088
2_H2	0.079	0.070	0.130	0.088	0.088	0.136
3_H1	0.070	0.087	0.076	0.102	0.150	0.095
3_H2	0.087	0.070	0.102	0.076	0.095	0.150
4_H1	0.075	0.074	0.096	0.111	0.108	0.090
4_H2	0.074	0.074	0.111	0.096	0.091	0.110
5_H1	0.084	0.052	0.108	0.079	0.125	0.125
5_H2	0.052	0.084	0.080	0.108	0.124	0.124
6_H1	0.079	0.082	0.085	0.096	0.095	0.139
6_H2	0.082	0.079	0.095	0.085	0.139	0.095
7_H1	0.076	0.068	0.077	0.085	0.097	0.141
7_H2	0.068	0.076	0.085	0.078	0.141	0.097
8_H1	0.076	0.085	0.098	0.095	0.100	0.105
8_H2	0.085	0.077	0.095	0.098	0.105	0.100
9_H1	0.078	0.065	0.099	0.097	0.117	0.129
9_H2	0.066	0.078	0.096	0.098	0.129	0.117
10_H1	0.088	0.075	0.102	0.102	0.096	0.088
10_H2	0.075	0.088	0.102	0.102	0.086	0.096
11_H1	0.091	0.076	0.092	0.110	0.172	0.091
11_H2	0.076	0.091	0.110	0.093	0.091	0.172
Min	0.052	0.052	0.076	0.076	0.086	0.088
Max	0.097	0.097	0.130	0.130	0.172	0.172
Mean	0.077	0.077	0.096	0.096	0.115	0.115
σ	0.010	0.010	0.013	0.013	0.024	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.091	0.091
Mean+σ	0.087	0.087	0.109	0.109	0.138	0.138
Q1	0.072	0.072	0.086	0.086	0.095	0.095
Median	0.076	0.077	0.096	0.097	0.107	0.108
Q3	0.084	0.084	0.102	0.102	0.135	0.134

Table A.90 BSR results (Bldg: U1)

U1	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.073	0.088	0.115	0.116	0.149
1_H2	0.074	0.101	0.114	0.091	0.146	0.113
2_H1	0.070	0.081	0.089	0.138	0.145	0.091
2_H2	0.083	0.070	0.138	0.090	0.091	0.143
3_H1	0.072	0.088	0.079	0.113	0.161	0.100
3_H2	0.091	0.071	0.113	0.081	0.100	0.161
4_H1	0.076	0.076	0.101	0.116	0.112	0.100
4_H2	0.075	0.076	0.117	0.101	0.097	0.114
5_H1	0.088	0.058	0.117	0.080	0.138	0.131
5_H2	0.059	0.087	0.081	0.116	0.133	0.143
6_H1	0.081	0.082	0.092	0.097	0.101	0.172
6_H2	0.084	0.080	0.098	0.089	0.171	0.100
7_H1	0.077	0.070	0.083	0.091	0.110	0.159
7_H2	0.069	0.077	0.087	0.079	0.158	0.108
8_H1	0.078	0.087	0.101	0.099	0.106	0.112
8_H2	0.088	0.078	0.097	0.103	0.115	0.107
9_H1	0.080	0.068	0.103	0.100	0.118	0.138
9_H2	0.067	0.082	0.101	0.103	0.138	0.126
10_H1	0.094	0.079	0.105	0.101	0.102	0.092
10_H2	0.077	0.094	0.104	0.102	0.094	0.103
11_H1	0.095	0.078	0.094	0.118	0.182	0.095
11_H2	0.077	0.093	0.120	0.095	0.095	0.183

Min	0.059	0.058	0.079	0.079	0.091	0.091
Max	0.101	0.101	0.138	0.138	0.182	0.183
Mean	0.080	0.080	0.101	0.101	0.124	0.125
σ	0.010	0.010	0.014	0.014	0.027	0.028
Mean-σ	0.070	0.070	0.086	0.086	0.097	0.097
Mean+σ	0.090	0.089	0.115	0.115	0.151	0.152
Q1	0.075	0.074	0.090	0.091	0.101	0.101
Median	0.077	0.078	0.101	0.101	0.116	0.113
Q3	0.087	0.085	0.111	0.111	0.143	0.143

Table A.91 BSR results (Bldg: U2)

U2	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.074	0.090	0.115	0.115	0.147
1_H2	0.074	0.101	0.114	0.090	0.147	0.115
2_H1	0.070	0.082	0.090	0.138	0.144	0.091
2_H2	0.082	0.070	0.138	0.090	0.091	0.143
3_H1	0.071	0.089	0.078	0.112	0.161	0.100
3_H2	0.090	0.071	0.112	0.079	0.100	0.161
4_H1	0.076	0.076	0.101	0.117	0.114	0.094
4_H2	0.076	0.076	0.117	0.101	0.094	0.114
5_H1	0.087	0.058	0.117	0.081	0.140	0.132
5_H2	0.058	0.087	0.081	0.117	0.133	0.140
6_H1	0.081	0.083	0.091	0.099	0.101	0.172
6_H2	0.083	0.080	0.099	0.090	0.171	0.101
7_H1	0.077	0.069	0.082	0.089	0.109	0.158
7_H2	0.069	0.077	0.088	0.081	0.158	0.109
8_H1	0.079	0.087	0.102	0.098	0.106	0.113
8_H2	0.087	0.079	0.098	0.102	0.114	0.106
9_H1	0.080	0.068	0.103	0.101	0.121	0.138
9_H2	0.068	0.081	0.101	0.103	0.138	0.122
10_H1	0.094	0.078	0.103	0.102	0.102	0.090
10_H2	0.078	0.094	0.103	0.103	0.091	0.103
11_H1	0.094	0.077	0.095	0.119	0.182	0.095
11_H2	0.077	0.094	0.119	0.095	0.095	0.182

Min	0.058	0.058	0.078	0.079	0.091	0.090
Max	0.101	0.101	0.138	0.138	0.182	0.182
Mean	0.080	0.080	0.101	0.101	0.124	0.124
σ	0.010	0.010	0.014	0.014	0.028	0.028
Mean-σ	0.070	0.070	0.087	0.087	0.096	0.096
Mean+σ	0.090	0.089	0.115	0.115	0.152	0.152
Q1	0.074	0.074	0.090	0.090	0.101	0.101
Median	0.078	0.079	0.101	0.101	0.114	0.114
Q3	0.086	0.086	0.110	0.110	0.143	0.143

Table A.92 BSR results (Bldg: U3)

U3	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.074	0.090	0.114	0.114	0.147
1_H2	0.074	0.101	0.115	0.090	0.148	0.115
2_H1	0.070	0.082	0.091	0.138	0.143	0.091
2_H2	0.082	0.070	0.138	0.089	0.091	0.144
3_H1	0.071	0.090	0.079	0.112	0.161	0.100
3_H2	0.089	0.071	0.113	0.078	0.100	0.161
4_H1	0.076	0.075	0.101	0.117	0.114	0.093
4_H2	0.076	0.076	0.117	0.101	0.095	0.113
5_H1	0.087	0.058	0.117	0.081	0.141	0.133
5_H2	0.058	0.087	0.081	0.117	0.132	0.139
6_H1	0.080	0.084	0.090	0.099	0.100	0.171
6_H2	0.083	0.081	0.098	0.092	0.172	0.101
7_H1	0.077	0.069	0.081	0.088	0.109	0.158
7_H2	0.069	0.077	0.089	0.082	0.159	0.110
8_H1	0.079	0.087	0.102	0.098	0.107	0.114
8_H2	0.087	0.079	0.098	0.101	0.113	0.106
9_H1	0.081	0.068	0.103	0.101	0.123	0.138
9_H2	0.068	0.080	0.101	0.103	0.138	0.120
10_H1	0.094	0.078	0.103	0.103	0.103	0.093
10_H2	0.078	0.094	0.102	0.104	0.090	0.102
11_H1	0.094	0.077	0.095	0.119	0.183	0.095
11_H2	0.077	0.094	0.119	0.094	0.095	0.182

Min	0.058	0.058	0.079	0.078	0.090	0.091
Max	0.101	0.101	0.138	0.138	0.183	0.182
Mean	0.080	0.080	0.101	0.101	0.124	0.124
σ	0.010	0.010	0.014	0.014	0.028	0.027
Mean-σ	0.070	0.070	0.087	0.087	0.096	0.097
Mean+σ	0.089	0.090	0.115	0.115	0.152	0.151
Q1	0.074	0.074	0.090	0.090	0.101	0.101
Median	0.079	0.078	0.101	0.101	0.114	0.115
Q3	0.086	0.086	0.110	0.110	0.143	0.143

Table A.93 BSR results (Bldg: U4)

U4	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.074	0.091	0.114	0.114	0.146
1_H2	0.073	0.101	0.115	0.089	0.148	0.116
2_H1	0.070	0.083	0.091	0.138	0.143	0.091
2_H2	0.082	0.070	0.138	0.089	0.091	0.144
3_H1	0.071	0.090	0.080	0.112	0.161	0.100
3_H2	0.089	0.071	0.113	0.078	0.100	0.161
4_H1	0.076	0.075	0.101	0.117	0.113	0.096
4_H2	0.076	0.076	0.116	0.101	0.097	0.112
5_H1	0.087	0.059	0.116	0.081	0.142	0.133
5_H2	0.058	0.087	0.080	0.117	0.132	0.139
6_H1	0.080	0.084	0.089	0.099	0.100	0.171
6_H2	0.083	0.081	0.097	0.092	0.172	0.101
7_H1	0.077	0.069	0.080	0.088	0.109	0.158
7_H2	0.070	0.077	0.090	0.083	0.159	0.110
8_H1	0.078	0.088	0.102	0.097	0.107	0.115
8_H2	0.087	0.078	0.099	0.101	0.113	0.106
9_H1	0.081	0.067	0.103	0.101	0.124	0.138
9_H2	0.068	0.080	0.100	0.103	0.138	0.119
10_H1	0.094	0.077	0.102	0.103	0.103	0.094
10_H2	0.079	0.094	0.101	0.104	0.091	0.102
11_H1	0.094	0.077	0.094	0.120	0.183	0.095
11_H2	0.078	0.095	0.118	0.094	0.095	0.182
Min	0.058	0.059	0.080	0.078	0.091	0.091
Max	0.101	0.101	0.138	0.138	0.183	0.182
Mean	0.080	0.080	0.101	0.101	0.124	0.124
σ	0.010	0.010	0.014	0.014	0.028	0.027
Mean-σ	0.070	0.070	0.086	0.086	0.097	0.097
Mean+σ	0.089	0.090	0.115	0.115	0.152	0.151
Q1	0.074	0.074	0.091	0.090	0.101	0.101
Median	0.078	0.078	0.101	0.101	0.113	0.115
Q3	0.086	0.087	0.111	0.110	0.143	0.143

Table A.94 BSR results (Bldg: Symmetric Mass)

SYMM	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.085	0.108	0.100	0.136
1_H2	0.072	0.097	0.109	0.085	0.137	0.100
2_H1	0.070	0.080	0.088	0.129	0.136	0.088
2_H2	0.080	0.070	0.129	0.088	0.088	0.136
3_H1	0.070	0.087	0.076	0.102	0.150	0.095
3_H2	0.087	0.070	0.102	0.076	0.095	0.150
4_H1	0.074	0.074	0.096	0.111	0.110	0.090
4_H2	0.074	0.074	0.111	0.096	0.090	0.110
5_H1	0.084	0.053	0.108	0.079	0.124	0.125
5_H2	0.052	0.084	0.079	0.108	0.125	0.124
6_H1	0.079	0.083	0.085	0.095	0.095	0.139
6_H2	0.083	0.079	0.095	0.085	0.139	0.095
7_H1	0.076	0.068	0.078	0.085	0.097	0.141
7_H2	0.068	0.076	0.085	0.078	0.141	0.097
8_H1	0.077	0.085	0.098	0.095	0.100	0.105
8_H2	0.085	0.077	0.095	0.098	0.105	0.100
9_H1	0.078	0.065	0.098	0.097	0.116	0.129
9_H2	0.065	0.078	0.097	0.098	0.129	0.116
10_H1	0.088	0.075	0.102	0.102	0.096	0.088
10_H2	0.075	0.088	0.102	0.102	0.088	0.096
11_H1	0.091	0.076	0.093	0.110	0.172	0.092
11_H2	0.076	0.091	0.110	0.093	0.091	0.172

Min	0.052	0.053	0.076	0.076	0.088	0.088
Max	0.097	0.097	0.129	0.129	0.172	0.172
Mean	0.077	0.077	0.096	0.096	0.115	0.115
σ	0.010	0.010	0.013	0.013	0.024	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.091	0.091
Mean+σ	0.087	0.087	0.109	0.109	0.138	0.138
Q1	0.072	0.072	0.086	0.086	0.095	0.095
Median	0.077	0.077	0.096	0.096	0.108	0.108
Q3	0.084	0.084	0.102	0.102	0.135	0.135

Table A.95 BSR results (Bldg: T4 Mass)

T4M	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.097	0.072	0.085	0.108	0.099	0.136
1_H2	0.072	0.097	0.109	0.086	0.136	0.099
2_H1	0.070	0.080	0.088	0.129	0.136	0.088
2_H2	0.080	0.070	0.129	0.088	0.087	0.137
3_H1	0.070	0.087	0.076	0.102	0.150	0.095
3_H2	0.087	0.070	0.102	0.076	0.095	0.150
4_H1	0.074	0.074	0.096	0.111	0.110	0.090
4_H2	0.074	0.075	0.111	0.096	0.090	0.110
5_H1	0.084	0.052	0.108	0.079	0.124	0.125
5_H2	0.052	0.084	0.079	0.108	0.125	0.124
6_H1	0.079	0.083	0.085	0.095	0.095	0.138
6_H2	0.083	0.079	0.095	0.085	0.139	0.095
7_H1	0.076	0.068	0.078	0.085	0.097	0.141
7_H2	0.068	0.076	0.085	0.078	0.141	0.096
8_H1	0.077	0.085	0.098	0.095	0.100	0.106
8_H2	0.085	0.077	0.095	0.097	0.105	0.100
9_H1	0.078	0.065	0.098	0.096	0.116	0.129
9_H2	0.065	0.078	0.096	0.098	0.129	0.116
10_H1	0.088	0.075	0.102	0.102	0.096	0.088
10_H2	0.075	0.088	0.102	0.102	0.088	0.096
11_H1	0.091	0.076	0.092	0.110	0.172	0.091
11_H2	0.076	0.091	0.110	0.093	0.091	0.172

Min	0.052	0.052	0.076	0.076	0.087	0.088
Max	0.097	0.097	0.129	0.129	0.172	0.172
Mean	0.077	0.077	0.096	0.096	0.115	0.115
σ	0.010	0.010	0.013	0.013	0.024	0.024
Mean-σ	0.068	0.068	0.084	0.084	0.091	0.091
Mean+σ	0.087	0.087	0.109	0.109	0.138	0.138
Q1	0.072	0.072	0.086	0.086	0.095	0.095
Median	0.076	0.076	0.096	0.096	0.108	0.108
Q3	0.084	0.084	0.102	0.102	0.134	0.134

Table A.96 BSR results (Bldg: U4 Mass)

U4M	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.074	0.090	0.113	0.114	0.146
1_H2	0.073	0.101	0.115	0.089	0.148	0.116
2_H1	0.070	0.083	0.090	0.137	0.143	0.091
2_H2	0.082	0.070	0.138	0.089	0.091	0.145
3_H1	0.071	0.090	0.079	0.112	0.161	0.100
3_H2	0.089	0.071	0.113	0.078	0.100	0.161
4_H1	0.076	0.075	0.101	0.117	0.113	0.097
4_H2	0.076	0.076	0.116	0.101	0.097	0.112
5_H1	0.087	0.059	0.116	0.081	0.142	0.133
5_H2	0.058	0.088	0.081	0.117	0.132	0.138
6_H1	0.081	0.084	0.089	0.099	0.100	0.171
6_H2	0.083	0.081	0.097	0.092	0.172	0.101
7_H1	0.077	0.069	0.080	0.087	0.109	0.158
7_H2	0.069	0.077	0.090	0.083	0.159	0.110
8_H1	0.078	0.088	0.102	0.097	0.107	0.115
8_H2	0.087	0.078	0.099	0.101	0.113	0.106
9_H1	0.081	0.067	0.103	0.101	0.124	0.138
9_H2	0.068	0.080	0.101	0.103	0.138	0.118
10_H1	0.094	0.077	0.103	0.104	0.102	0.095
10_H2	0.078	0.094	0.102	0.105	0.091	0.102
11_H1	0.094	0.077	0.095	0.120	0.183	0.095
11_H2	0.078	0.095	0.119	0.094	0.095	0.182

Min	0.058	0.059	0.079	0.078	0.091	0.091
Max	0.101	0.101	0.138	0.137	0.183	0.182
Mean	0.080	0.080	0.101	0.101	0.124	0.124
σ	0.010	0.010	0.014	0.014	0.028	0.027
Mean-σ	0.070	0.070	0.086	0.086	0.097	0.097
Mean+σ	0.089	0.090	0.115	0.115	0.152	0.151
Q1	0.074	0.074	0.090	0.090	0.101	0.101
Median	0.078	0.077	0.101	0.101	0.113	0.115
Q3	0.086	0.087	0.111	0.110	0.143	0.143

Table A.97 BSR results (Bldg: U4 Group 1)

U4GR1	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.074	0.090	0.113	0.114	0.145
1_H2	0.073	0.101	0.115	0.088	0.148	0.115
2_H1	0.070	0.082	0.091	0.137	0.143	0.091
2_H2	0.082	0.070	0.138	0.089	0.091	0.144
3_H1	0.071	0.090	0.080	0.111	0.161	0.100
3_H2	0.089	0.071	0.113	0.078	0.100	0.161
4_H1	0.076	0.075	0.101	0.116	0.114	0.096
4_H2	0.076	0.076	0.116	0.100	0.096	0.112
5_H1	0.087	0.058	0.117	0.081	0.141	0.133
5_H2	0.058	0.087	0.080	0.117	0.132	0.137
6_H1	0.080	0.084	0.089	0.098	0.100	0.169
6_H2	0.083	0.081	0.098	0.092	0.172	0.101
7_H1	0.077	0.069	0.080	0.087	0.109	0.157
7_H2	0.069	0.077	0.090	0.083	0.159	0.109
8_H1	0.079	0.088	0.102	0.097	0.107	0.115
8_H2	0.087	0.078	0.098	0.101	0.113	0.105
9_H1	0.081	0.067	0.103	0.100	0.123	0.137
9_H2	0.068	0.080	0.101	0.103	0.138	0.118
10_H1	0.094	0.077	0.103	0.104	0.103	0.094
10_H2	0.078	0.094	0.102	0.105	0.090	0.101
11_H1	0.094	0.077	0.095	0.119	0.182	0.094
11_H2	0.077	0.095	0.119	0.094	0.095	0.181
Min	0.058	0.058	0.080	0.078	0.090	0.091
Max	0.101	0.101	0.138	0.137	0.182	0.181
Mean	0.080	0.080	0.101	0.101	0.124	0.123
σ	0.010	0.010	0.014	0.014	0.028	0.027
Mean-σ	0.070	0.070	0.086	0.086	0.096	0.097
Mean+σ	0.089	0.090	0.115	0.115	0.152	0.150
Q1	0.074	0.074	0.090	0.089	0.101	0.101
Median	0.079	0.077	0.101	0.100	0.114	0.115
Q3	0.086	0.087	0.110	0.110	0.143	0.142

Table A.98 BSR results (Bldg: U4 Group 5)

U4GR5	Site Class A		Site Class C		Site Class D	
	BSR-X	BSR-Y	BSR-X	BSR-Y	BSR-X	BSR-Y
1_H1	0.101	0.075	0.091	0.114	0.114	0.147
1_H2	0.074	0.101	0.116	0.089	0.149	0.116
2_H1	0.071	0.083	0.091	0.138	0.144	0.092
2_H2	0.082	0.071	0.139	0.089	0.092	0.146
3_H1	0.071	0.091	0.080	0.113	0.162	0.101
3_H2	0.089	0.072	0.114	0.079	0.101	0.162
4_H1	0.076	0.075	0.101	0.118	0.115	0.097
4_H2	0.076	0.076	0.117	0.101	0.097	0.113
5_H1	0.087	0.059	0.117	0.082	0.142	0.134
5_H2	0.059	0.088	0.081	0.118	0.132	0.138
6_H1	0.081	0.085	0.090	0.099	0.101	0.172
6_H2	0.083	0.082	0.098	0.093	0.172	0.102
7_H1	0.077	0.069	0.081	0.088	0.109	0.158
7_H2	0.070	0.078	0.090	0.083	0.159	0.110
8_H1	0.079	0.088	0.103	0.098	0.107	0.116
8_H2	0.088	0.078	0.099	0.102	0.114	0.106
9_H1	0.081	0.068	0.104	0.101	0.125	0.139
9_H2	0.068	0.080	0.101	0.104	0.138	0.119
10_H1	0.094	0.078	0.103	0.105	0.103	0.095
10_H2	0.079	0.094	0.103	0.105	0.091	0.102
11_H1	0.094	0.078	0.095	0.120	0.184	0.095
11_H2	0.078	0.095	0.119	0.095	0.095	0.183

Min	0.059	0.059	0.080	0.079	0.091	0.092
Max	0.101	0.101	0.139	0.138	0.184	0.183
Mean	0.080	0.080	0.101	0.102	0.125	0.125
σ	0.010	0.010	0.014	0.015	0.028	0.027
Mean-σ	0.070	0.070	0.087	0.087	0.097	0.097
Mean+σ	0.090	0.090	0.116	0.116	0.153	0.152
Q1	0.074	0.075	0.091	0.090	0.101	0.102
Median	0.079	0.078	0.101	0.101	0.114	0.116
Q3	0.086	0.087	0.111	0.111	0.144	0.144

Table A.99 PFA results (Bldg: Symmetric – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.713	1.553	1.454	1.454	1.565	1.809	2.213	2.778	2.778
1_H2	2.227	1.912	2.027	1.643	1.413	1.626	2.440	3.003	3.003
2_H1	1.230	1.110	1.330	1.368	1.213	1.081	1.539	2.017	2.017
2_H2	2.168	2.295	2.130	1.622	1.485	1.545	1.960	2.414	2.414
3_H1	1.480	1.327	1.204	1.071	1.516	1.864	2.260	2.630	2.630
3_H2	1.591	1.468	1.517	1.378	1.524	1.696	2.183	2.582	2.582
4_H1	1.412	1.257	1.152	1.149	1.467	1.652	1.869	2.210	2.210
4_H2	1.294	1.100	1.062	1.098	1.254	1.460	1.719	2.027	2.027
5_H1	1.531	1.313	1.187	1.074	1.302	1.515	1.745	2.021	2.021
5_H2	0.817	0.797	0.751	0.664	0.622	0.710	0.798	0.901	0.901
6_H1	1.728	1.611	1.552	1.345	1.391	1.616	2.111	2.771	2.771
6_H2	2.349	1.946	1.930	1.906	2.036	2.246	3.507	4.573	4.573
7_H1	2.230	1.985	1.915	1.640	1.500	1.738	2.464	3.138	3.138
7_H2	2.652	2.646	2.180	1.333	1.644	2.106	2.971	3.652	3.652
8_H1	4.368	3.739	3.426	2.141	2.098	2.788	4.015	5.196	5.196
8_H2	3.031	2.180	2.009	2.042	2.286	2.730	4.190	5.329	5.329
9_H1	1.688	1.320	1.108	1.133	1.529	1.966	2.391	2.727	2.727
9_H2	1.210	1.096	0.972	0.958	1.152	1.333	1.522	1.703	1.703
10_H1	1.542	1.278	1.206	1.090	1.304	1.453	1.734	2.039	2.039
10_H2	1.162	0.991	0.907	0.910	0.975	1.190	1.349	1.460	1.460
11_H1	1.569	1.290	1.233	1.215	1.381	1.636	2.053	2.401	2.401
11_H2	1.349	1.182	1.089	1.106	1.312	1.485	1.688	1.961	1.961
Min	0.817	0.797	0.751	0.664	0.622	0.710	0.798	0.901	0.901
Max	4.368	3.739	3.426	2.141	2.286	2.788	4.190	5.329	5.329
Mean	1.834	1.609	1.515	1.334	1.453	1.693	2.215	2.706	2.706
σ	0.776	0.668	0.604	0.374	0.358	0.479	0.829	1.121	1.121
Mean-σ	1.058	0.941	0.911	0.960	1.095	1.214	1.386	1.585	1.585
Mean+σ	2.609	2.277	2.120	1.707	1.812	2.172	3.043	3.828	3.828
Q1	1.365	1.201	1.119	1.092	1.302	1.466	1.723	2.022	2.022
Median	1.580	1.323	1.281	1.274	1.440	1.631	2.082	2.498	2.498
Q3	2.212	1.938	1.927	1.580	1.527	1.851	2.428	2.946	2.946

Table A.100 PFA results (Bldg: Symmetric – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.227	1.912	2.027	1.643	1.413	1.626	2.440	3.003	3.003
1_H2	1.713	1.553	1.454	1.454	1.565	1.809	2.213	2.778	2.778
2_H1	2.168	2.295	2.130	1.622	1.485	1.545	1.960	2.414	2.414
2_H2	1.230	1.110	1.330	1.368	1.213	1.081	1.539	2.017	2.017
3_H1	1.591	1.468	1.517	1.378	1.524	1.696	2.183	2.582	2.582
3_H2	1.480	1.327	1.204	1.071	1.516	1.864	2.260	2.630	2.630
4_H1	1.294	1.100	1.062	1.098	1.254	1.460	1.719	2.027	2.027
4_H2	1.412	1.257	1.152	1.149	1.467	1.652	1.869	2.210	2.210
5_H1	0.817	0.797	0.751	0.664	0.622	0.710	0.798	0.901	0.901
5_H2	1.531	1.313	1.187	1.074	1.302	1.515	1.745	2.021	2.021
6_H1	2.349	1.946	1.930	1.906	2.036	2.246	3.507	4.573	4.573
6_H2	1.728	1.611	1.552	1.345	1.391	1.616	2.111	2.771	2.771
7_H1	2.652	2.646	2.180	1.333	1.644	2.106	2.971	3.652	3.652
7_H2	2.230	1.985	1.915	1.640	1.500	1.738	2.464	3.138	3.138
8_H1	3.031	2.180	2.009	2.042	2.286	2.730	4.190	5.329	5.329
8_H2	4.368	3.739	3.426	2.141	2.098	2.788	4.015	5.196	5.196
9_H1	1.210	1.096	0.972	0.958	1.152	1.333	1.522	1.703	1.703
9_H2	1.688	1.320	1.108	1.133	1.529	1.966	2.391	2.727	2.727
10_H1	1.162	0.991	0.907	0.910	0.975	1.190	1.349	1.460	1.460
10_H2	1.542	1.278	1.206	1.090	1.304	1.453	1.734	2.039	2.039
11_H1	1.349	1.182	1.089	1.106	1.312	1.485	1.688	1.961	1.961
11_H2	1.569	1.290	1.233	1.215	1.381	1.636	2.053	2.401	2.401

Min	0.817	0.797	0.751	0.664	0.622	0.710	0.798	0.901	0.901
Max	4.368	3.739	3.426	2.141	2.286	2.788	4.190	5.329	5.329
Mean	1.834	1.609	1.515	1.334	1.453	1.693	2.215	2.706	2.706
σ	0.776	0.668	0.604	0.374	0.358	0.479	0.829	1.121	1.121
Mean-σ	1.058	0.941	0.911	0.960	1.095	1.214	1.386	1.585	1.585
Mean+σ	2.609	2.277	2.119	1.707	1.812	2.172	3.043	3.828	3.828
Q1	1.365	1.201	1.119	1.092	1.302	1.466	1.723	2.022	2.022
Median	1.580	1.323	1.281	1.274	1.440	1.631	2.082	2.498	2.498
Q3	2.212	1.938	1.927	1.580	1.527	1.851	2.428	2.946	2.946

Table A.101 PFA results (Bldg: Symmetric – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.981	1.713	1.715	1.594	1.760	1.906	2.365	2.883	2.883
1_H2	2.111	1.830	1.640	1.656	1.660	1.983	2.507	3.031	3.031
2_H1	2.743	2.117	1.897	1.470	2.090	2.164	2.768	3.438	3.438
2_H2	2.608	2.672	2.569	1.918	2.147	2.525	2.818	3.731	3.731
3_H1	2.548	2.292	2.091	1.905	1.829	2.323	3.410	4.201	4.201
3_H2	3.079	2.618	2.026	2.065	2.140	2.702	3.453	4.368	4.368
4_H1	1.915	1.741	1.382	1.429	1.721	2.095	2.214	2.365	2.365
4_H2	2.215	1.949	1.735	1.720	1.860	1.947	2.466	3.064	3.064
5_H1	1.857	1.514	1.362	1.266	1.424	1.883	2.301	2.581	2.581
5_H2	1.698	1.581	1.524	1.253	1.529	1.707	2.070	2.487	2.487
6_H1	1.670	1.549	1.573	1.679	1.699	1.831	2.289	2.784	2.784
6_H2	2.193	2.041	1.880	1.951	2.278	2.271	2.574	3.151	3.151
7_H1	1.573	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
7_H2	1.527	1.531	1.411	1.304	1.527	1.680	1.902	2.320	2.320
8_H1	1.668	1.504	1.813	1.932	1.798	1.720	2.511	3.089	3.089
8_H2	1.991	1.616	1.517	1.479	1.808	2.443	3.157	3.707	3.707
9_H1	3.239	3.717	3.313	2.142	3.017	3.269	3.176	3.908	3.908
9_H2	3.171	3.093	2.516	2.492	2.902	2.917	3.434	4.391	4.391
10_H1	3.053	2.949	2.751	3.082	2.719	3.086	3.903	5.301	5.301
10_H2	2.486	2.335	2.435	2.669	2.685	3.109	4.708	5.981	5.981
11_H1	2.285	2.772	2.434	1.889	2.309	2.462	3.096	4.217	4.217
11_H2	1.906	1.992	1.624	1.621	1.592	1.812	2.504	3.193	3.193

Min	1.527	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
Max	3.239	3.717	3.313	3.082	3.017	3.269	4.708	5.981	5.981
Mean	2.251	2.113	1.928	1.799	1.990	2.244	2.789	3.462	3.462
σ	0.543	0.626	0.535	0.487	0.487	0.512	0.703	0.994	0.994
Mean-σ	1.708	1.488	1.393	1.312	1.502	1.732	2.086	2.468	2.468
Mean+σ	2.793	2.739	2.464	2.286	2.477	2.757	3.491	4.456	4.456
Q1	1.869	1.590	1.536	1.472	1.670	1.844	2.317	2.809	2.809
Median	2.152	1.971	1.774	1.700	1.818	2.130	2.543	3.172	3.172
Q3	2.593	2.547	2.348	1.946	2.245	2.509	3.171	4.128	4.128

Table A.102 PFA results (Bldg: Symmetric – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.111	1.830	1.640	1.656	1.660	1.983	2.507	3.031	3.031
1_H2	1.981	1.713	1.715	1.594	1.760	1.906	2.365	2.883	2.883
2_H1	2.608	2.672	2.569	1.918	2.147	2.525	2.818	3.731	3.731
2_H2	2.743	2.117	1.897	1.470	2.090	2.164	2.768	3.438	3.438
3_H1	3.079	2.618	2.026	2.065	2.140	2.702	3.453	4.368	4.368
3_H2	2.548	2.292	2.091	1.905	1.829	2.323	3.410	4.201	4.201
4_H1	2.215	1.949	1.735	1.720	1.860	1.947	2.466	3.064	3.064
4_H2	1.915	1.741	1.382	1.429	1.721	2.095	2.214	2.365	2.365
5_H1	1.698	1.581	1.524	1.253	1.529	1.707	2.070	2.487	2.487
5_H2	1.857	1.514	1.362	1.266	1.424	1.883	2.301	2.581	2.581
6_H1	2.193	2.041	1.880	1.951	2.278	2.271	2.574	3.151	3.151
6_H2	1.670	1.549	1.573	1.679	1.699	1.831	2.289	2.784	2.784
7_H1	1.527	1.531	1.411	1.304	1.527	1.680	1.902	2.320	2.320
7_H2	1.573	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
8_H1	1.991	1.616	1.517	1.479	1.808	2.443	3.157	3.707	3.707
8_H2	1.668	1.504	1.813	1.932	1.798	1.720	2.511	3.089	3.089
9_H1	3.171	3.093	2.516	2.492	2.902	2.917	3.434	4.391	4.391
9_H2	3.239	3.717	3.313	2.142	3.017	3.269	3.176	3.908	3.908
10_H1	2.486	2.335	2.435	2.670	2.685	3.109	4.708	5.981	5.981
10_H2	3.053	2.949	2.751	3.082	2.719	3.086	3.903	5.301	5.301
11_H1	1.906	1.992	1.624	1.621	1.592	1.812	2.504	3.193	3.193
11_H2	2.285	2.772	2.434	1.889	2.309	2.462	3.096	4.217	4.217

Min	1.527	1.363	1.221	1.060	1.279	1.537	1.725	1.971	1.971
Max	3.239	3.717	3.313	3.082	3.017	3.269	4.708	5.981	5.981
Mean	2.251	2.113	1.928	1.799	1.990	2.244	2.789	3.462	3.462
σ	0.543	0.626	0.535	0.487	0.487	0.512	0.703	0.994	0.994
Mean-σ	1.708	1.488	1.393	1.312	1.502	1.732	2.086	2.468	2.468
Mean+σ	2.793	2.739	2.464	2.286	2.477	2.757	3.491	4.456	4.456
Q1	1.869	1.590	1.536	1.472	1.670	1.844	2.317	2.809	2.809
Median	2.152	1.971	1.774	1.700	1.818	2.130	2.543	3.172	3.172
Q3	2.593	2.547	2.348	1.946	2.245	2.509	3.171	4.128	4.128

Table A.103 PFA results (Bldg: Symmetric – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.266	2.556	1.850	1.573	2.155	2.934	4.024	4.998	4.998
1_H2	2.744	2.346	1.967	1.751	2.161	2.777	3.237	3.723	3.723
2_H1	2.565	2.289	2.084	1.881	2.095	2.429	2.823	3.501	3.501
2_H2	2.134	1.953	1.621	1.548	1.696	1.999	2.432	2.898	2.898
3_H1	2.105	1.965	1.901	1.865	1.979	1.961	2.160	2.560	2.560
3_H2	1.595	1.378	1.258	1.232	1.436	1.564	1.773	2.110	2.110
4_H1	3.543	2.741	3.010	2.469	2.366	3.179	4.505	5.719	5.719
4_H2	4.149	3.820	2.810	2.540	3.165	3.817	4.308	5.769	5.769
5_H1	2.644	2.676	2.495	1.808	2.015	2.315	3.196	4.084	4.084
5_H2	2.001	1.961	1.983	1.799	1.842	1.879	2.708	3.562	3.562
6_H1	1.782	1.437	1.244	1.209	1.417	1.674	2.051	2.473	2.473
6_H2	1.886	1.755	1.725	1.743	1.719	1.818	1.993	2.146	2.146
7_H1	1.790	1.584	1.357	1.308	1.546	1.754	2.080	2.535	2.535
7_H2	2.113	1.935	1.745	1.718	1.860	2.068	2.279	2.855	2.855
8_H1	2.346	1.755	1.393	1.254	1.661	2.138	2.825	3.448	3.448
8_H2	1.897	1.537	1.346	1.301	1.409	1.697	2.083	2.380	2.380
9_H1	2.477	2.285	2.315	2.253	2.714	2.930	3.896	5.094	5.094
9_H2	3.341	2.481	2.101	2.613	3.355	3.695	4.571	5.816	5.816
10_H1	2.480	2.167	2.133	2.185	2.333	2.324	3.043	4.114	4.114
10_H2	5.392	4.536	3.473	2.226	2.875	4.385	5.718	6.859	6.859
11_H1	4.416	3.656	2.847	2.586	2.649	3.431	4.166	4.508	4.508
11_H2	2.050	2.076	2.142	2.315	2.526	2.479	3.062	4.097	4.097

Min	1.595	1.378	1.244	1.209	1.409	1.564	1.773	2.110	2.110
Max	5.392	4.536	3.473	2.613	3.355	4.385	5.718	6.859	6.859
Mean	2.669	2.313	2.036	1.872	2.135	2.511	3.133	3.875	3.875
σ	0.978	0.799	0.601	0.466	0.561	0.788	1.059	1.367	1.367
Mean-σ	1.691	1.514	1.436	1.406	1.574	1.723	2.074	2.508	2.508
Mean+σ	3.647	3.112	2.637	2.338	2.696	3.299	4.192	5.242	5.242
Q1	2.013	1.800	1.647	1.555	1.701	1.899	2.190	2.634	2.634
Median	2.412	2.121	1.975	1.803	2.055	2.320	2.934	3.642	3.642
Q3	3.135	2.537	2.272	2.246	2.486	2.933	3.992	4.875	4.875

Table A.104 PFA results (Bldg: Symmetric – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.744	2.346	1.967	1.751	2.161	2.777	3.237	3.723	3.723
1_H2	3.266	2.556	1.850	1.573	2.155	2.934	4.024	4.998	4.998
2_H1	2.134	1.953	1.621	1.548	1.696	1.999	2.432	2.898	2.898
2_H2	2.565	2.289	2.084	1.881	2.095	2.429	2.823	3.501	3.501
3_H1	1.595	1.378	1.258	1.232	1.436	1.564	1.773	2.110	2.110
3_H2	2.105	1.965	1.901	1.865	1.979	1.961	2.160	2.560	2.560
4_H1	4.149	3.820	2.810	2.540	3.165	3.817	4.308	5.769	5.769
4_H2	3.543	2.741	3.010	2.469	2.366	3.179	4.505	5.719	5.719
5_H1	2.001	1.961	1.983	1.799	1.842	1.879	2.708	3.562	3.562
5_H2	2.644	2.676	2.495	1.808	2.015	2.315	3.196	4.084	4.084
6_H1	1.886	1.755	1.725	1.743	1.719	1.818	1.993	2.146	2.146
6_H2	1.782	1.437	1.244	1.209	1.417	1.674	2.051	2.473	2.473
7_H1	2.113	1.935	1.745	1.718	1.860	2.068	2.279	2.855	2.855
7_H2	1.790	1.584	1.357	1.308	1.546	1.754	2.080	2.535	2.535
8_H1	1.897	1.537	1.346	1.301	1.409	1.697	2.083	2.380	2.380
8_H2	2.346	1.755	1.393	1.254	1.661	2.138	2.825	3.448	3.448
9_H1	3.341	2.480	2.101	2.613	3.355	3.695	4.571	5.816	5.816
9_H2	2.477	2.285	2.315	2.253	2.714	2.930	3.896	5.094	5.094
10_H1	5.392	4.536	3.473	2.226	2.875	4.385	5.718	6.859	6.859
10_H2	2.480	2.167	2.133	2.185	2.333	2.324	3.043	4.114	4.114
11_H1	2.050	2.076	2.142	2.315	2.526	2.479	3.062	4.097	4.097
11_H2	4.416	3.656	2.847	2.586	2.649	3.431	4.166	4.508	4.508

Min	1.595	1.378	1.244	1.209	1.409	1.564	1.773	2.110	2.110
Max	5.392	4.536	3.473	2.613	3.355	4.385	5.718	6.859	6.859
Mean	2.669	2.313	2.036	1.872	2.135	2.511	3.133	3.875	3.875
σ	0.978	0.799	0.601	0.466	0.561	0.788	1.059	1.367	1.367
Mean-σ	1.691	1.514	1.436	1.406	1.574	1.723	2.074	2.508	2.508
Mean+σ	3.647	3.112	2.637	2.338	2.696	3.299	4.192	5.242	5.242
Q1	2.013	1.800	1.647	1.555	1.701	1.899	2.190	2.634	2.634
Median	2.412	2.121	1.975	1.803	2.055	2.320	2.934	3.642	3.642
Q3	3.135	2.537	2.272	2.246	2.486	2.933	3.992	4.875	4.875

Table A.105 PFA results (Bldg: T1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.770	1.607	1.431	1.444	1.601	1.921	2.389	2.983	2.983
1_H2	2.612	2.184	2.056	1.517	1.390	1.911	2.871	3.552	3.552
2_H1	1.178	1.090	1.141	1.223	1.130	0.976	1.424	1.834	1.834
2_H2	2.232	2.482	2.004	1.641	1.470	1.611	1.982	2.545	2.545
3_H1	1.523	1.377	1.197	1.272	1.634	1.971	2.202	2.580	2.580
3_H2	1.641	1.606	1.487	1.375	1.614	1.772	2.171	2.600	2.600
4_H1	1.352	1.194	1.093	1.181	1.349	1.603	1.800	2.189	2.189
4_H2	1.265	1.094	1.041	1.120	1.227	1.476	1.699	2.044	2.044
5_H1	1.572	1.335	1.150	1.043	1.298	1.593	1.791	2.047	2.047
5_H2	0.823	0.831	0.736	0.664	0.642	0.681	0.763	0.869	0.869
6_H1	1.766	1.691	1.523	1.480	1.404	1.768	2.313	3.083	3.083
6_H2	2.182	1.869	1.656	1.836	1.977	2.253	3.113	4.092	4.092
7_H1	2.214	2.056	1.913	1.774	1.463	1.680	2.587	3.180	3.180
7_H2	2.812	2.640	2.091	1.333	1.803	2.273	2.998	3.702	3.702
8_H1	4.030	4.040	3.488	2.145	2.206	2.786	4.238	5.341	5.341
8_H2	2.982	2.250	2.007	2.127	2.225	2.842	3.980	5.281	5.281
9_H1	1.622	1.300	1.136	1.269	1.569	1.857	2.085	2.459	2.459
9_H2	1.141	1.045	0.952	0.966	1.115	1.285	1.397	1.486	1.486
10_H1	1.557	1.283	1.182	1.140	1.283	1.511	1.741	2.077	2.077
10_H2	1.087	0.981	0.853	0.841	0.969	1.195	1.269	1.345	1.345
11_H1	1.568	1.304	1.245	1.263	1.374	1.664	1.980	2.394	2.394
11_H2	1.333	1.156	1.054	1.142	1.273	1.491	1.676	1.996	1.996

Min	0.823	0.831	0.736	0.664	0.642	0.681	0.763	0.869	0.869
Max	4.030	4.040	3.488	2.145	2.225	2.842	4.238	5.341	5.341
Mean	1.830	1.655	1.474	1.354	1.455	1.733	2.203	2.713	2.713
σ	0.750	0.735	0.610	0.376	0.373	0.509	0.839	1.142	1.142
Mean-σ	1.080	0.920	0.864	0.978	1.082	1.223	1.364	1.571	1.571
Mean+σ	2.581	2.390	2.085	1.730	1.828	2.242	3.043	3.854	3.854
Q1	1.338	1.165	1.104	1.140	1.275	1.496	1.709	2.045	2.045
Median	1.597	1.356	1.221	1.270	1.397	1.672	2.034	2.502	2.502
Q3	2.206	2.009	1.849	1.507	1.611	1.918	2.537	3.156	3.156

Table A.106 PFA results (Bldg: T1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	1.768	1.732	1.901	1.801	1.488	1.707	2.002	2.650	2.650
1_H2	1.668	1.612	1.532	1.607	1.519	1.803	2.131	2.395	2.395
2_H1	2.032	2.089	1.961	1.803	1.537	1.630	1.910	2.486	2.486
2_H2	1.277	1.184	1.360	1.370	1.284	1.241	1.594	2.191	2.191
3_H1	1.490	1.480	1.488	1.460	1.473	1.694	2.117	2.578	2.578
3_H2	1.510	1.424	1.312	1.097	1.303	1.762	2.267	2.743	2.743
4_H1	1.302	1.178	1.045	1.158	1.242	1.473	1.770	2.102	2.102
4_H2	1.564	1.183	1.069	1.159	1.465	1.806	2.090	2.541	2.541
5_H1	0.819	0.867	0.763	0.697	0.654	0.779	0.882	0.978	0.978
5_H2	1.491	1.231	1.119	1.095	1.308	1.479	1.727	2.055	2.055
6_H1	2.247	2.085	2.133	2.074	2.113	2.423	3.403	4.575	4.575
6_H2	1.629	1.629	1.572	1.594	1.505	1.629	2.105	2.577	2.577
7_H1	2.541	2.581	2.218	1.592	1.499	1.916	2.811	3.484	3.484
7_H2	2.451	2.101	1.964	1.832	1.454	1.715	2.473	3.120	3.120
8_H1	2.963	2.440	2.121	2.180	2.478	3.098	4.228	5.427	5.427
8_H2	4.374	3.636	3.396	2.168	1.897	2.735	3.638	4.270	4.374
9_H1	1.322	1.090	0.934	1.036	1.169	1.425	1.620	1.865	1.865
9_H2	1.874	1.614	1.255	1.156	1.620	2.060	2.441	2.843	2.843
10_H1	1.174	1.059	0.963	0.939	1.060	1.232	1.382	1.568	1.568
10_H2	1.535	1.248	1.147	1.150	1.254	1.523	1.779	2.100	2.100
11_H1	1.457	1.166	1.053	1.147	1.333	1.603	1.828	2.174	2.174
11_H2	1.524	1.265	1.127	1.258	1.450	1.719	2.075	2.505	2.505

Min	0.819	0.867	0.763	0.697	0.654	0.779	0.882	0.978	0.978
Max	4.374	3.636	3.396	2.180	2.478	3.098	4.228	5.427	5.427
Mean	1.819	1.632	1.520	1.426	1.459	1.748	2.194	2.692	2.697
σ	0.754	0.646	0.608	0.415	0.363	0.498	0.760	1.002	1.010
Mean-σ	1.064	0.986	0.912	1.011	1.096	1.250	1.434	1.690	1.687
Mean+σ	2.573	2.277	2.127	1.841	1.823	2.246	2.955	3.694	3.707
Q1	1.465	1.183	1.081	1.148	1.289	1.490	1.773	2.120	2.120
Median	1.550	1.452	1.336	1.314	1.460	1.701	2.082	2.523	2.523
Q3	1.993	1.997	1.946	1.753	1.516	1.805	2.398	2.818	2.818

Table A.107 PFA results (Bldg: T1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.054	1.881	1.711	1.664	1.835	2.066	2.605	3.033	3.033
1_H2	2.246	1.806	1.595	1.718	1.690	2.014	2.647	3.226	3.226
2_H1	2.621	2.087	2.001	1.616	2.021	2.166	2.770	3.535	3.535
2_H2	2.676	2.878	2.701	2.247	2.295	2.501	2.968	3.890	3.890
3_H1	2.446	2.180	1.832	1.565	1.651	2.228	3.240	4.072	4.072
3_H2	2.884	2.395	1.866	1.946	1.963	2.694	3.441	4.484	4.484
4_H1	1.645	1.577	1.328	1.420	1.620	1.863	2.035	2.349	2.349
4_H2	2.211	1.895	1.728	1.707	1.823	2.028	2.415	3.075	3.075
5_H1	1.759	1.485	1.311	1.201	1.640	2.050	2.307	2.446	2.446
5_H2	1.691	1.620	1.416	1.226	1.542	1.849	2.234	2.743	2.743
6_H1	1.627	1.532	1.498	1.592	1.567	1.778	2.139	2.545	2.545
6_H2	2.253	2.115	1.722	1.985	2.112	2.353	2.774	3.409	3.409
7_H1	1.567	1.306	1.150	1.079	1.170	1.403	1.654	1.898	1.898
7_H2	1.674	1.602	1.324	1.288	1.531	1.797	2.007	2.333	2.333
8_H1	1.597	1.671	1.894	2.004	1.662	1.894	2.167	2.799	2.799
8_H2	2.060	1.694	1.463	1.457	1.823	2.545	3.120	3.671	3.671
9_H1	3.644	3.887	3.236	1.955	3.031	3.534	3.580	4.021	4.021
9_H2	3.165	2.734	2.242	2.659	2.693	2.608	3.208	4.318	4.318
10_H1	2.580	3.126	2.900	2.902	2.546	3.112	3.946	4.955	4.955
10_H2	2.203	2.408	2.330	2.622	2.486	2.961	4.412	5.989	5.989
11_H1	2.475	2.723	1.879	1.949	2.028	2.483	2.857	3.794	3.794
11_H2	1.868	1.949	1.812	1.708	1.581	1.834	2.492	3.250	3.250

Min	1.567	1.306	1.150	1.079	1.170	1.403	1.654	1.898	1.898
Max	3.644	3.887	3.236	2.902	3.031	3.534	4.412	5.989	5.989
Mean	2.225	2.116	1.861	1.796	1.923	2.262	2.774	3.447	3.447
σ	0.554	0.634	0.537	0.482	0.449	0.506	0.678	0.967	0.967
Mean-σ	1.671	1.481	1.323	1.314	1.475	1.756	2.096	2.480	2.480
Mean+σ	2.779	2.750	2.398	2.278	2.372	2.768	3.451	4.414	4.414
Q1	1.708	1.632	1.472	1.484	1.625	1.871	2.252	2.757	2.757
Median	2.207	1.922	1.770	1.707	1.823	2.116	2.708	3.329	3.329
Q3	2.553	2.404	1.974	1.977	2.091	2.534	3.186	3.988	3.988

Table A.108 PFA results (Bldg: T1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	1.896	1.608	1.623	1.694	1.830	2.137	2.611	3.471	3.471
1_H2	1.888	1.818	1.644	1.763	1.682	1.987	2.351	2.854	2.854
2_H1	2.506	2.818	2.578	2.190	2.094	2.332	2.637	3.331	3.331
2_H2	3.035	2.432	1.880	1.559	2.172	2.305	2.988	3.810	3.810
3_H1	3.594	3.189	2.269	2.238	2.354	2.939	3.467	4.531	4.531
3_H2	2.954	2.721	2.256	2.009	1.876	2.391	3.200	4.037	4.037
4_H1	2.189	1.971	1.776	1.770	1.936	2.102	2.526	3.250	3.250
4_H2	2.245	1.772	1.460	1.461	1.860	2.464	2.754	2.980	2.980
5_H1	1.446	1.540	1.427	1.253	1.435	1.573	1.770	2.230	2.230
5_H2	1.956	1.613	1.382	1.310	1.492	1.824	2.151	2.447	2.447
6_H1	1.998	2.075	1.912	1.989	2.201	2.343	2.797	3.466	3.466
6_H2	1.977	1.635	1.649	1.711	1.718	2.136	2.612	3.413	3.413
7_H1	1.369	1.455	1.429	1.446	1.517	1.673	2.003	2.503	2.503
7_H2	1.494	1.316	1.218	1.162	1.272	1.651	1.956	2.192	2.192
8_H1	2.360	1.823	1.719	1.655	1.893	2.537	3.203	3.740	3.740
8_H2	1.608	1.578	1.875	2.199	1.863	1.834	2.410	3.148	3.148
9_H1	3.752	2.882	2.619	2.513	2.968	3.405	4.195	5.416	5.416
9_H2	3.198	3.387	3.232	2.215	2.741	3.018	3.245	4.092	4.092
10_H1	3.282	2.748	2.474	2.517	2.789	3.803	5.244	6.714	6.714
10_H2	4.088	3.582	3.137	3.187	2.720	3.000	4.500	6.137	6.137
11_H1	2.316	1.913	1.652	1.757	1.739	1.915	2.431	3.151	3.151
11_H2	2.375	2.725	2.095	1.968	2.184	2.389	3.396	4.578	4.578

Min	1.369	1.316	1.218	1.162	1.272	1.573	1.770	2.192	2.192
Max	4.088	3.582	3.232	3.187	2.968	3.803	5.244	6.714	6.714
Mean	2.433	2.209	1.968	1.889	2.015	2.353	2.929	3.704	3.704
σ	0.780	0.684	0.556	0.480	0.465	0.580	0.853	1.185	1.185
Mean-σ	1.653	1.525	1.412	1.409	1.550	1.773	2.076	2.519	2.519
Mean+σ	3.213	2.894	2.525	2.370	2.481	2.933	3.783	4.890	4.890
Q1	1.911	1.619	1.628	1.583	1.724	1.933	2.415	3.022	3.022
Median	2.280	1.942	1.826	1.766	1.884	2.318	2.696	3.440	3.440
Q3	3.014	2.742	2.266	2.197	2.196	2.519	3.234	4.078	4.078

Table A.109 PFA results (Bldg: T1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.958	2.350	1.638	1.717	2.005	2.959	4.001	4.999	4.999
1_H2	2.799	2.441	1.881	1.823	2.142	2.853	3.431	4.005	4.005
2_H1	2.534	2.233	1.982	1.827	2.157	2.483	2.823	3.557	3.557
2_H2	2.258	1.945	1.559	1.609	1.679	2.151	2.568	3.010	3.010
3_H1	2.079	1.918	1.850	1.933	1.961	1.908	2.145	2.561	2.561
3_H2	1.679	1.399	1.234	1.217	1.390	1.603	1.859	2.251	2.251
4_H1	3.415	2.877	2.401	2.632	2.326	3.305	4.331	5.570	5.570
4_H2	4.046	3.279	2.897	2.684	2.712	3.664	4.701	6.675	6.675
5_H1	2.682	2.678	2.286	1.741	1.891	2.453	3.051	3.707	3.707
5_H2	2.038	2.195	1.887	1.824	1.926	2.034	2.704	3.612	3.612
6_H1	1.780	1.383	1.203	1.211	1.406	1.657	2.000	2.450	2.450
6_H2	1.884	1.715	1.635	1.684	1.691	1.839	2.005	2.151	2.151
7_H1	1.815	1.566	1.289	1.236	1.543	1.800	2.109	2.595	2.595
7_H2	2.145	1.950	1.782	1.677	1.827	2.055	2.263	2.910	2.910
8_H1	2.193	1.622	1.386	1.326	1.609	2.104	2.567	3.239	3.239
8_H2	1.804	1.480	1.353	1.316	1.397	1.680	1.967	2.241	2.241
9_H1	2.389	2.467	2.086	2.136	2.434	2.985	3.617	4.823	4.823
9_H2	3.416	2.389	2.175	2.735	3.262	3.332	4.370	5.406	5.406
10_H1	2.474	2.376	2.018	1.981	1.970	2.193	2.951	3.696	3.696
10_H2	5.207	4.116	2.991	2.617	2.942	4.491	5.558	6.900	6.900
11_H1	4.075	3.210	2.706	2.810	2.671	3.453	4.368	4.906	4.906
11_H2	2.032	2.277	2.271	2.460	2.362	2.394	2.865	4.102	4.102

Min	1.679	1.383	1.203	1.211	1.390	1.603	1.859	2.151	2.151
Max	5.207	4.116	2.991	2.810	3.262	4.491	5.558	6.900	6.900
Mean	2.623	2.267	1.932	1.918	2.059	2.518	3.102	3.880	3.880
σ	0.908	0.679	0.517	0.529	0.513	0.768	1.052	1.406	1.406
Mean-σ	1.715	1.588	1.415	1.389	1.546	1.750	2.051	2.475	2.475
Mean+σ	3.531	2.945	2.449	2.447	2.572	3.286	4.154	5.286	5.286
Q1	2.034	1.766	1.578	1.626	1.682	1.939	2.175	2.674	2.674
Median	2.323	2.255	1.884	1.824	1.965	2.293	2.844	3.654	3.654
Q3	2.918	2.461	2.247	2.379	2.353	2.979	3.905	4.885	4.885

Table A.110 PFA results (Bldg: T1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.799	2.580	2.006	1.769	2.162	2.719	3.099	3.404	3.404
1_H2	3.538	3.016	2.058	1.774	2.296	3.049	3.982	4.733	4.733
2_H1	1.915	1.928	1.597	1.656	1.727	2.001	2.346	3.071	3.071
2_H2	2.376	2.301	2.146	1.923	2.129	2.242	2.851	3.674	3.674
3_H1	1.536	1.344	1.264	1.246	1.371	1.569	1.793	2.068	2.068
3_H2	2.231	1.990	1.955	1.899	1.921	1.920	2.211	2.768	2.768
4_H1	4.631	4.035	3.527	3.386	2.979	3.315	4.165	5.286	5.286
4_H2	4.163	3.224	3.688	2.624	3.324	3.495	4.552	6.359	6.359
5_H1	1.914	2.101	1.985	1.829	1.787	1.974	2.658	3.326	3.326
5_H2	2.349	2.388	2.228	1.958	2.064	2.127	2.993	3.959	3.959
6_H1	1.881	1.770	1.727	1.733	1.707	1.739	1.984	2.174	2.174
6_H2	1.750	1.593	1.343	1.244	1.442	1.622	2.043	2.578	2.578
7_H1	2.044	1.866	1.751	1.721	1.896	2.020	2.256	2.816	2.816
7_H2	1.651	1.582	1.385	1.299	1.507	1.664	1.895	2.306	2.306
8_H1	1.993	1.651	1.405	1.316	1.561	1.750	2.097	2.528	2.528
8_H2	3.058	2.150	1.499	1.300	1.775	2.318	3.001	3.750	3.750
9_H1	3.674	2.908	2.359	2.520	3.197	3.458	5.353	7.029	7.029
9_H2	2.899	2.744	2.376	2.412	2.907	3.472	4.473	5.786	5.786
10_H1	5.800	5.150	3.964	2.447	2.768	4.411	5.377	6.234	6.234
10_H2	2.483	1.970	2.042	2.234	2.300	2.616	3.441	4.762	4.762
11_H1	1.944	2.025	2.091	2.402	2.526	2.760	3.492	4.812	4.812
11_H2	3.937	3.570	2.772	2.732	2.756	3.084	3.985	4.794	4.794

Min	1.536	1.344	1.264	1.244	1.371	1.569	1.793	2.068	2.068
Max	5.800	5.150	3.964	3.386	3.324	4.411	5.377	7.029	7.029
Mean	2.753	2.449	2.144	1.974	2.186	2.515	3.184	4.010	4.010
σ	1.113	0.915	0.749	0.565	0.589	0.779	1.111	1.478	1.478
Mean-σ	1.640	1.535	1.395	1.409	1.598	1.736	2.072	2.532	2.532
Mean+σ	3.866	3.364	2.893	2.539	2.775	3.294	4.295	5.488	5.488
Q1	1.922	1.882	1.629	1.672	1.739	1.934	2.222	2.780	2.780
Median	2.362	2.125	2.024	1.864	2.097	2.280	2.997	3.712	3.712
Q3	3.418	2.867	2.326	2.410	2.698	3.075	3.984	4.807	4.807

Table A.111 PFA results (Bldg: T2 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.732	1.579	1.549	1.454	1.587	1.850	2.297	2.850	2.850
1_H2	2.480	2.074	2.017	1.563	1.402	1.802	2.752	3.391	3.391
2_H1	1.151	1.076	1.199	1.329	1.189	1.069	1.492	1.885	1.885
2_H2	2.181	2.370	2.009	1.584	1.479	1.555	1.931	2.422	2.422
3_H1	1.549	1.415	1.287	1.152	1.581	1.886	2.326	2.792	2.792
3_H2	1.630	1.507	1.538	1.381	1.586	1.711	2.173	2.620	2.620
4_H1	1.416	1.187	1.111	1.118	1.379	1.596	1.881	2.271	2.271
4_H2	1.319	1.077	1.075	1.087	1.233	1.452	1.747	2.085	2.085
5_H1	1.579	1.322	1.152	1.046	1.281	1.543	1.764	2.073	2.073
5_H2	0.818	0.808	0.771	0.668	0.646	0.701	0.817	0.917	0.917
6_H1	1.785	1.657	1.540	1.359	1.397	1.691	2.243	2.900	2.900
6_H2	2.443	2.087	1.884	1.820	1.952	2.271	3.473	4.577	4.577
7_H1	2.280	1.993	1.921	1.636	1.459	1.718	2.543	3.285	3.285
7_H2	2.730	2.625	2.121	1.259	1.743	2.172	3.022	3.804	3.804
8_H1	4.287	3.850	3.493	2.098	2.161	2.727	4.096	5.344	5.344
8_H2	3.102	2.441	2.159	1.988	2.374	2.841	4.181	5.491	5.491
9_H1	1.679	1.333	1.145	1.149	1.604	1.973	2.404	2.838	2.838
9_H2	1.236	1.085	0.991	0.957	1.122	1.343	1.529	1.735	1.735
10_H1	1.601	1.304	1.186	1.093	1.276	1.455	1.770	2.126	2.126
10_H2	1.162	1.030	0.910	0.853	0.985	1.181	1.301	1.421	1.421
11_H1	1.569	1.287	1.236	1.247	1.372	1.608	2.053	2.451	2.451
11_H2	1.371	1.141	1.069	1.098	1.279	1.457	1.708	2.039	2.039

Min	0.818	0.808	0.771	0.668	0.646	0.701	0.817	0.917	0.917
Max	4.287	3.850	3.493	2.098	2.374	2.841	4.181	5.491	5.491
Mean	1.868	1.648	1.516	1.315	1.458	1.709	2.250	2.787	2.787
σ	0.781	0.707	0.611	0.356	0.376	0.492	0.844	1.166	1.166
Mean-σ	1.087	0.940	0.905	0.959	1.083	1.217	1.406	1.621	1.621
Mean+σ	2.650	2.355	2.128	1.672	1.834	2.201	3.094	3.953	3.953
Q1	1.383	1.152	1.120	1.094	1.276	1.455	1.752	2.076	2.076
Median	1.616	1.374	1.262	1.253	1.400	1.650	2.113	2.535	2.535
Q3	2.255	2.054	1.912	1.536	1.587	1.877	2.508	3.189	3.189

Table A.112 PFA results (Bldg: T2 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.053	1.799	1.947	1.785	1.440	1.658	2.171	2.727	2.727
1_H2	1.759	1.641	1.628	1.618	1.591	1.793	2.099	2.575	2.575
2_H1	2.056	2.181	1.991	1.783	1.543	1.577	1.916	2.388	2.388
2_H2	1.374	1.183	1.379	1.351	1.227	1.321	1.765	2.344	2.344
3_H1	1.659	1.548	1.516	1.424	1.563	1.755	2.233	2.727	2.727
3_H2	1.524	1.438	1.305	1.115	1.389	1.838	2.345	2.845	2.845
4_H1	1.458	1.298	1.050	1.154	1.258	1.543	1.928	2.248	2.248
4_H2	1.513	1.217	1.102	1.191	1.460	1.762	2.004	2.439	2.439
5_H1	0.922	0.932	0.813	0.694	0.668	0.778	0.927	1.097	1.097
5_H2	1.574	1.330	1.168	1.118	1.204	1.544	1.736	2.031	2.031
6_H1	2.446	2.172	2.076	2.109	1.983	2.623	3.592	4.762	4.762
6_H2	2.085	1.617	1.592	1.529	1.467	1.957	2.547	3.081	3.081
7_H1	2.687	2.692	2.275	1.492	1.643	2.048	2.998	3.790	3.790
7_H2	2.468	2.099	1.961	1.813	1.486	1.744	2.653	3.430	3.430
8_H1	3.037	2.291	2.221	2.181	2.472	2.999	4.242	5.573	5.573
8_H2	4.665	3.778	3.470	2.214	2.124	3.096	4.188	5.397	5.397
9_H1	1.497	1.273	1.017	1.042	1.247	1.546	1.851	2.161	2.161
9_H2	1.803	1.505	1.253	1.159	1.585	2.127	2.594	3.029	3.029
10_H1	1.186	1.075	0.977	0.922	1.065	1.255	1.388	1.550	1.550
10_H2	1.557	1.279	1.183	1.152	1.279	1.484	1.741	2.132	2.132
11_H1	1.476	1.248	1.108	1.143	1.372	1.645	1.829	2.173	2.173
11_H2	1.593	1.297	1.175	1.260	1.431	1.683	2.072	2.497	2.497

Min	0.922	0.932	0.813	0.694	0.668	0.778	0.927	1.097	1.097
Max	4.665	3.778	3.470	2.214	2.472	3.096	4.242	5.573	5.573
Mean	1.927	1.677	1.555	1.420	1.477	1.808	2.310	2.863	2.863
σ	0.794	0.651	0.612	0.416	0.369	0.533	0.825	1.133	1.133
Mean-σ	1.133	1.026	0.943	1.005	1.109	1.275	1.484	1.730	1.730
Mean+σ	2.720	2.328	2.167	1.836	1.846	2.341	3.135	3.997	3.997
Q1	1.501	1.274	1.123	1.146	1.263	1.545	1.835	2.191	2.191
Median	1.626	1.472	1.342	1.305	1.450	1.714	2.085	2.536	2.536
Q3	2.078	2.024	1.958	1.741	1.580	1.927	2.582	3.068	3.068

Table A.113 PFA results (Bldg: T2 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.021	1.729	1.709	1.521	1.842	1.996	2.519	3.001	3.001
1_H2	2.358	1.984	1.678	1.668	1.674	2.140	2.688	3.256	3.256
2_H1	2.698	2.090	2.012	1.570	2.095	2.131	2.857	3.531	3.531
2_H2	2.628	2.718	2.648	2.035	2.244	2.576	2.844	3.801	3.801
3_H1	2.612	2.296	1.851	1.634	1.698	2.325	3.400	4.153	4.153
3_H2	3.027	2.614	2.015	1.878	2.084	2.656	3.455	4.427	4.427
4_H1	1.846	1.701	1.370	1.418	1.670	2.040	2.164	2.311	2.311
4_H2	2.202	1.954	1.748	1.666	1.829	1.971	2.412	3.038	3.038
5_H1	1.883	1.564	1.360	1.232	1.568	2.021	2.455	2.772	2.772
5_H2	1.747	1.683	1.578	1.222	1.593	1.826	2.178	2.616	2.616
6_H1	1.668	1.509	1.499	1.544	1.578	1.812	2.287	2.749	2.749
6_H2	2.242	2.114	1.886	1.918	2.135	2.269	2.738	3.415	3.415
7_H1	1.554	1.357	1.226	1.041	1.209	1.524	1.732	1.974	1.974
7_H2	1.632	1.578	1.408	1.250	1.528	1.733	1.933	2.258	2.258
8_H1	1.581	1.577	1.892	1.902	1.660	1.790	2.294	2.808	2.808
8_H2	2.112	1.664	1.533	1.393	1.804	2.450	3.238	3.861	3.861
9_H1	3.563	3.817	3.255	1.905	2.987	3.433	3.468	4.112	4.112
9_H2	3.238	2.813	2.122	2.492	2.815	2.856	3.429	4.487	4.487
10_H1	2.909	3.152	2.948	3.089	2.827	3.037	4.011	5.394	5.394
10_H2	2.392	2.307	2.334	2.381	2.507	3.136	4.672	6.119	6.119
11_H1	2.479	2.507	2.081	1.830	2.073	2.397	3.055	3.937	3.937
11_H2	1.876	1.942	1.779	1.691	1.593	1.828	2.544	3.332	3.332

Min	1.554	1.357	1.226	1.041	1.209	1.524	1.732	1.974	1.974
Max	3.563	3.817	3.255	3.089	2.987	3.433	4.672	6.119	6.119
Mean	2.285	2.121	1.906	1.740	1.955	2.270	2.835	3.516	3.516
σ	0.564	0.613	0.516	0.469	0.473	0.503	0.706	1.016	1.016
Mean-σ	1.721	1.508	1.390	1.271	1.482	1.767	2.129	2.500	2.500
Mean+σ	2.849	2.735	2.422	2.209	2.428	2.774	3.541	4.532	4.532
Q1	1.854	1.669	1.544	1.444	1.610	1.864	2.323	2.781	2.781
Median	2.222	1.969	1.815	1.667	1.816	2.136	2.713	3.374	3.374
Q3	2.624	2.457	2.065	1.904	2.125	2.544	3.359	4.068	4.068

Table A.114 PFA results (Bldg: T2 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.067	1.763	1.661	1.774	1.798	2.141	2.467	3.057	3.057
1_H2	2.028	1.863	1.672	1.726	1.696	1.969	2.446	3.056	3.056
2_H1	2.549	2.710	2.594	2.169	2.148	2.463	2.707	3.329	3.329
2_H2	3.094	2.355	1.913	1.567	2.152	2.255	3.181	3.956	3.956
3_H1	3.398	2.990	2.139	2.215	2.353	2.939	3.781	4.690	4.690
3_H2	3.429	2.715	2.039	1.951	1.928	2.277	3.291	4.157	4.157
4_H1	2.324	2.052	1.789	1.752	1.948	2.143	2.619	3.261	3.261
4_H2	2.337	1.999	1.454	1.458	1.796	2.465	2.856	3.088	3.088
5_H1	1.573	1.609	1.429	1.293	1.418	1.668	1.960	2.398	2.398
5_H2	1.967	1.607	1.391	1.302	1.466	1.850	2.140	2.592	2.592
6_H1	2.130	2.202	1.939	2.059	2.234	2.389	2.715	3.406	3.406
6_H2	2.057	1.714	1.556	1.752	1.764	2.132	2.717	3.338	3.338
7_H1	1.558	1.648	1.565	1.464	1.579	1.680	2.068	2.526	2.526
7_H2	1.567	1.402	1.261	1.141	1.269	1.632	1.924	2.110	2.110
8_H1	2.309	1.777	1.654	1.596	1.835	2.615	3.301	3.893	3.893
8_H2	1.759	1.652	1.873	2.165	1.976	2.035	2.577	3.454	3.454
9_H1	3.797	2.960	2.517	2.550	3.091	3.541	4.283	5.269	5.269
9_H2	3.315	3.569	3.360	2.183	2.991	3.342	3.463	4.320	4.320
10_H1	3.211	2.712	2.506	2.725	2.909	3.437	4.897	6.370	6.370
10_H2	3.872	3.255	3.121	3.296	2.941	3.086	4.173	5.817	5.817
11_H1	2.183	1.988	2.022	1.712	1.860	1.863	2.444	3.102	3.102
11_H2	2.525	3.109	2.504	2.069	2.605	2.736	3.335	4.657	4.657

Min	1.558	1.402	1.261	1.141	1.269	1.632	1.924	2.110	2.110
Max	3.872	3.569	3.360	3.296	3.091	3.541	4.897	6.370	6.370
Mean	2.502	2.257	1.998	1.905	2.080	2.393	2.970	3.720	3.720
σ	0.729	0.637	0.561	0.509	0.533	0.577	0.789	1.105	1.105
Mean-σ	1.774	1.620	1.438	1.396	1.547	1.817	2.181	2.615	2.615
Mean+σ	3.231	2.894	2.559	2.415	2.612	2.970	3.760	4.825	4.825
Q1	2.035	1.726	1.587	1.574	1.772	1.986	2.452	3.065	3.065
Median	2.316	2.026	1.893	1.763	1.938	2.266	2.716	3.372	3.372
Q3	3.182	2.714	2.412	2.168	2.323	2.706	3.326	4.279	4.279

Table A.115 PFA results (Bldg: T2 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.228	2.520	1.809	1.653	2.137	3.010	4.028	5.050	5.050
1_H2	2.822	2.363	1.898	1.691	2.120	2.775	3.348	3.925	3.925
2_H1	2.522	2.292	2.059	1.809	2.163	2.470	2.792	3.507	3.507
2_H2	2.223	1.970	1.580	1.513	1.704	2.097	2.450	2.927	2.927
3_H1	2.117	1.980	1.911	1.910	1.973	1.931	2.194	2.697	2.697
3_H2	1.657	1.434	1.264	1.215	1.417	1.579	1.847	2.238	2.238
4_H1	3.461	2.788	2.581	2.577	2.440	3.247	4.400	5.718	5.718
4_H2	4.112	3.603	2.985	2.606	2.806	3.617	4.613	6.478	6.478
5_H1	2.686	2.635	2.396	1.714	1.907	2.407	3.147	3.946	3.946
5_H2	2.019	2.012	1.863	1.716	1.889	1.966	2.752	3.619	3.619
6_H1	1.831	1.507	1.289	1.222	1.444	1.719	2.042	2.484	2.484
6_H2	1.916	1.804	1.671	1.701	1.698	1.857	2.025	2.214	2.214
7_H1	1.798	1.594	1.352	1.261	1.540	1.776	2.104	2.536	2.536
7_H2	2.150	1.979	1.825	1.724	1.914	2.086	2.270	2.859	2.859
8_H1	2.462	1.901	1.459	1.269	1.591	2.082	2.856	3.566	3.566
8_H2	1.927	1.585	1.398	1.331	1.460	1.745	2.033	2.360	2.360
9_H1	2.535	2.263	2.168	2.210	2.539	3.070	3.851	5.010	5.010
9_H2	3.482	2.453	2.107	2.654	3.226	3.525	4.715	6.111	6.111
10_H1	2.476	2.288	1.991	1.901	2.021	2.171	2.968	3.794	3.794
10_H2	5.541	4.605	3.579	2.398	2.882	4.503	5.778	7.049	7.049
11_H1	4.445	3.574	2.624	2.715	2.656	3.440	4.312	4.990	4.990
11_H2	2.132	2.093	2.236	2.327	2.514	2.406	3.148	4.416	4.416

Min	1.657	1.434	1.264	1.215	1.417	1.579	1.847	2.214	2.214
Max	5.541	4.605	3.579	2.715	3.226	4.503	5.778	7.049	7.049
Mean	2.706	2.329	2.002	1.869	2.093	2.522	3.167	3.977	3.977
σ	0.983	0.765	0.576	0.495	0.512	0.775	1.087	1.453	1.453
Mean-σ	1.723	1.565	1.426	1.373	1.581	1.747	2.080	2.525	2.525
Mean+σ	3.689	3.094	2.578	2.364	2.605	3.297	4.254	5.430	5.430
Q1	2.043	1.918	1.603	1.548	1.699	1.940	2.213	2.738	2.738
Median	2.469	2.178	1.904	1.720	1.997	2.288	2.912	3.707	3.707
Q3	3.126	2.504	2.219	2.298	2.496	3.055	3.984	5.005	5.005

Table A.116 PFA results (Bldg: T2 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.904	2.569	1.939	1.797	2.182	2.852	3.403	3.699	3.699
1_H2	3.573	2.876	1.974	1.830	2.351	3.144	4.174	5.055	5.055
2_H1	2.152	2.185	1.760	1.656	1.774	2.213	2.612	3.080	3.080
2_H2	2.489	2.375	2.151	1.922	2.151	2.376	2.779	3.490	3.490
3_H1	1.685	1.492	1.305	1.258	1.384	1.577	1.848	2.250	2.250
3_H2	2.182	2.000	1.956	1.936	2.012	1.931	2.210	2.820	2.820
4_H1	4.615	4.222	3.682	2.867	3.129	3.826	4.710	6.619	6.619
4_H2	4.182	3.822	3.318	2.796	3.121	3.997	5.051	6.725	6.725
5_H1	2.048	2.132	2.005	1.743	2.154	2.212	2.819	3.904	3.904
5_H2	2.504	2.873	2.598	1.915	2.025	2.441	3.309	4.264	4.264
6_H1	1.962	1.760	1.771	1.770	1.709	1.767	2.098	2.340	2.340
6_H2	1.762	1.561	1.390	1.292	1.563	1.735	2.035	2.472	2.472
7_H1	2.146	1.953	1.811	1.733	1.914	2.107	2.331	3.050	3.050
7_H2	1.862	1.721	1.446	1.300	1.620	1.837	2.053	2.477	2.477
8_H1	1.944	1.638	1.414	1.251	1.531	1.770	2.132	2.506	2.506
8_H2	2.760	2.059	1.556	1.298	1.700	2.264	2.968	3.690	3.690
9_H1	3.572	2.701	2.245	2.540	3.011	3.677	5.116	6.745	6.745
9_H2	2.823	2.590	2.401	2.404	3.063	3.532	4.312	5.986	5.986
10_H1	5.793	5.072	3.757	2.458	2.841	4.429	5.702	6.434	6.434
10_H2	2.620	2.066	1.979	2.193	2.355	2.591	3.462	4.476	4.476
11_H1	2.105	2.080	2.125	2.574	2.692	2.732	3.339	4.728	4.728
11_H2	4.371	3.758	2.778	2.782	2.694	3.115	3.944	4.687	4.687

Min	1.685	1.492	1.305	1.251	1.384	1.577	1.848	2.250	2.250
Max	5.793	5.072	3.757	2.867	3.129	4.429	5.702	6.745	6.745
Mean	2.821	2.523	2.153	1.969	2.226	2.642	3.291	4.159	4.159
σ	1.090	0.936	0.698	0.534	0.566	0.827	1.147	1.541	1.541
Mean-σ	1.731	1.587	1.455	1.434	1.660	1.815	2.144	2.618	2.618
Mean+σ	3.911	3.459	2.850	2.503	2.792	3.469	4.439	5.699	5.699
Q1	2.062	1.965	1.763	1.675	1.725	1.975	2.241	2.878	2.878
Median	2.496	2.158	1.976	1.873	2.152	2.408	3.138	3.801	3.801
Q3	3.405	2.830	2.362	2.444	2.693	3.137	4.117	4.973	4.973

Table A.117 PFA results (Bldg: T3 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.774	1.526	1.613	1.590	1.596	1.827	2.269	2.816	2.816
1_H2	2.411	2.032	1.991	1.777	1.433	1.751	2.675	3.289	3.289
2_H1	1.294	1.148	1.262	1.346	1.230	1.187	1.593	2.072	2.072
2_H2	2.184	2.355	2.091	1.702	1.511	1.570	1.937	2.433	2.433
3_H1	1.694	1.609	1.505	1.132	1.564	1.867	2.426	2.967	2.967
3_H2	1.619	1.455	1.590	1.460	1.555	1.710	2.173	2.562	2.562
4_H1	1.531	1.196	1.134	1.113	1.408	1.687	2.009	2.407	2.407
4_H2	1.479	1.232	1.066	1.115	1.253	1.514	1.940	2.272	2.272
5_H1	1.602	1.413	1.202	1.053	1.286	1.540	1.755	2.073	2.073
5_H2	0.822	0.816	0.783	0.676	0.647	0.745	0.887	0.997	0.997
6_H1	1.743	1.604	1.560	1.376	1.408	1.644	2.203	2.858	2.858
6_H2	2.644	2.083	2.033	1.855	2.145	2.550	3.609	4.821	4.821
7_H1	2.382	1.993	1.941	1.639	1.458	1.798	2.598	3.442	3.442
7_H2	2.720	2.623	2.205	1.356	1.755	2.156	2.999	3.871	3.871
8_H1	4.442	3.800	3.526	2.186	2.148	2.733	4.033	5.207	5.207
8_H2	3.410	2.806	2.258	2.016	2.660	3.160	4.338	5.770	5.770
9_H1	1.953	1.549	1.362	1.113	1.512	2.099	2.748	3.264	3.264
9_H2	1.379	1.164	1.036	0.981	1.210	1.398	1.668	1.965	1.965
10_H1	1.653	1.408	1.193	1.119	1.274	1.557	1.776	2.137	2.137
10_H2	1.238	1.168	1.023	0.887	1.021	1.182	1.342	1.473	1.473
11_H1	1.579	1.360	1.226	1.335	1.456	1.619	2.124	2.528	2.528
11_H2	1.454	1.164	1.097	1.115	1.297	1.501	1.781	2.120	2.120

Min	0.822	0.816	0.783	0.676	0.647	0.745	0.887	0.997	0.997
Max	4.442	3.800	3.526	2.186	2.660	3.160	4.338	5.770	5.770
Mean	1.955	1.705	1.577	1.361	1.492	1.763	2.313	2.879	2.879
σ	0.806	0.693	0.614	0.383	0.414	0.532	0.841	1.175	1.175
Mean-σ	1.149	1.012	0.963	0.979	1.078	1.232	1.472	1.705	1.705
Mean+σ	2.761	2.398	2.191	1.744	1.906	2.295	3.154	4.054	4.054
Q1	1.492	1.205	1.149	1.113	1.277	1.520	1.777	2.124	2.124
Median	1.674	1.491	1.433	1.341	1.445	1.665	2.149	2.545	2.545
Q3	2.332	2.023	1.978	1.626	1.562	1.857	2.656	3.283	3.283

Table A.118 PFA results (Bldg: T3 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.294	1.995	1.991	1.728	1.475	1.694	2.334	2.827	2.827
1_H2	1.848	1.633	1.739	1.563	1.634	1.823	2.167	2.662	2.662
2_H1	2.097	2.256	2.020	1.662	1.533	1.586	1.938	2.342	2.342
2_H2	1.420	1.221	1.413	1.354	1.305	1.412	1.850	2.441	2.441
3_H1	1.831	1.564	1.562	1.421	1.637	1.827	2.341	2.811	2.811
3_H2	1.647	1.509	1.315	1.132	1.527	1.921	2.503	2.990	2.990
4_H1	1.627	1.417	1.086	1.108	1.315	1.653	2.081	2.382	2.382
4_H2	1.503	1.250	1.117	1.133	1.437	1.672	1.970	2.343	2.343
5_H1	0.993	0.973	0.873	0.676	0.712	0.858	0.985	1.138	1.138
5_H2	1.637	1.384	1.174	1.098	1.212	1.535	1.805	2.064	2.064
6_H1	2.627	2.049	2.050	2.011	2.073	2.681	3.784	4.925	4.925
6_H2	2.430	1.795	1.608	1.376	1.566	2.069	2.778	3.368	3.368
7_H1	2.793	2.769	2.272	1.435	1.704	2.162	3.288	4.157	4.157
7_H2	2.463	2.092	1.944	1.640	1.497	1.824	2.752	3.604	3.604
8_H1	3.152	2.423	2.206	2.024	2.457	2.912	4.308	5.560	5.560
8_H2	4.912	3.964	3.651	2.095	2.262	3.177	4.312	5.717	5.717
9_H1	1.702	1.388	1.067	1.073	1.297	1.614	1.994	2.273	2.273
9_H2	1.795	1.467	1.232	1.124	1.528	2.043	2.588	3.005	3.005
10_H1	1.272	1.120	0.981	0.907	1.058	1.283	1.458	1.560	1.560
10_H2	1.577	1.351	1.230	1.153	1.289	1.509	1.782	2.135	2.135
11_H1	1.563	1.342	1.155	1.098	1.378	1.646	1.872	2.165	2.165
11_H2	1.643	1.330	1.241	1.240	1.428	1.642	2.103	2.478	2.478

Min	0.993	0.973	0.873	0.676	0.712	0.858	0.985	1.138	1.138
Max	4.912	3.964	3.651	2.095	2.457	3.177	4.312	5.717	5.717
Mean	2.038	1.741	1.588	1.366	1.515	1.843	2.409	2.952	2.952
σ	0.831	0.673	0.628	0.374	0.377	0.525	0.855	1.192	1.192
Mean-σ	1.207	1.068	0.959	0.992	1.137	1.318	1.554	1.760	1.760
Mean+σ	2.868	2.413	2.216	1.740	1.892	2.368	3.263	4.144	4.144
Q1	1.590	1.344	1.160	1.112	1.307	1.593	1.889	2.290	2.290
Median	1.748	1.488	1.364	1.297	1.486	1.683	2.135	2.570	2.570
Q3	2.396	2.035	1.979	1.621	1.617	2.013	2.711	3.277	3.277

Table A.119 PFA results (Bldg: T3 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.193	1.796	1.704	1.569	1.828	2.029	2.514	2.991	2.991
1_H2	2.435	2.079	1.821	1.757	1.810	2.204	2.607	3.102	3.102
2_H1	3.005	2.157	1.969	1.532	2.203	2.297	2.982	3.858	3.858
2_H2	2.612	2.690	2.612	2.001	2.211	2.555	2.826	3.765	3.765
3_H1	2.872	2.440	2.091	1.738	1.894	2.365	3.481	4.239	4.239
3_H2	3.106	2.811	2.222	2.033	2.513	2.870	3.763	4.869	4.869
4_H1	2.195	1.903	1.513	1.465	1.739	2.302	2.644	2.835	2.835
4_H2	2.199	2.019	1.764	1.680	1.854	2.028	2.438	3.056	3.056
5_H1	2.082	1.733	1.372	1.355	1.628	2.006	2.489	2.883	2.883
5_H2	1.738	1.576	1.525	1.246	1.576	1.737	2.154	2.580	2.580
6_H1	1.999	1.615	1.516	1.655	1.706	1.982	2.538	3.171	3.171
6_H2	2.225	2.046	1.884	1.935	2.148	2.221	2.791	3.494	3.494
7_H1	1.690	1.479	1.265	1.096	1.269	1.665	1.994	2.241	2.241
7_H2	1.590	1.550	1.479	1.287	1.497	1.684	2.033	2.478	2.478
8_H1	1.596	1.603	1.918	2.002	1.869	1.871	2.356	2.911	2.911
8_H2	2.327	1.814	1.700	1.481	1.813	2.482	3.429	4.154	4.154
9_H1	3.552	3.801	3.397	1.999	2.965	3.403	3.425	4.314	4.314
9_H2	3.586	2.950	2.285	2.473	2.947	3.281	3.874	4.872	4.872
10_H1	3.619	3.342	3.000	3.434	3.407	3.093	4.486	6.403	6.403
10_H2	2.821	2.338	2.365	2.399	2.615	3.571	4.998	6.515	6.515
11_H1	2.581	2.522	2.114	1.878	2.094	2.458	3.306	4.288	4.288
11_H2	2.236	1.969	1.835	1.726	1.694	1.877	2.596	3.420	3.420

Min	1.590	1.479	1.265	1.096	1.269	1.665	1.994	2.241	2.241
Max	3.619	3.801	3.397	3.434	3.407	3.571	4.998	6.515	6.515
Mean	2.466	2.192	1.971	1.806	2.058	2.363	2.988	3.747	3.747
σ	0.623	0.617	0.526	0.504	0.534	0.561	0.783	1.150	1.150
Mean-σ	1.843	1.575	1.445	1.303	1.524	1.802	2.205	2.597	2.597
Mean+σ	3.090	2.810	2.496	2.310	2.592	2.923	3.770	4.897	4.897
Q1	2.110	1.748	1.569	1.494	1.714	1.988	2.495	2.931	2.931
Median	2.281	2.033	1.859	1.732	1.861	2.259	2.717	3.457	3.457
Q3	2.860	2.502	2.195	2.001	2.209	2.537	3.428	4.276	4.276

Table A.120 PFA results (Bldg: T3 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.412	2.068	1.841	1.830	1.889	2.313	2.713	3.308	3.308
1_H2	2.313	1.982	1.777	1.606	1.944	2.149	2.743	3.401	3.401
2_H1	2.534	2.700	2.623	1.960	2.223	2.622	2.790	3.554	3.554
2_H2	2.955	2.292	1.981	1.548	2.149	2.292	3.019	3.884	3.884
3_H1	3.229	2.790	2.124	2.067	2.548	3.016	3.922	4.849	4.849
3_H2	3.766	2.958	2.107	1.798	2.023	2.376	3.416	4.451	4.451
4_H1	2.419	2.146	1.818	1.706	1.963	2.184	2.684	3.297	3.297
4_H2	2.471	2.030	1.430	1.452	1.783	2.438	2.884	3.150	3.150
5_H1	1.713	1.593	1.501	1.245	1.556	1.823	2.217	2.683	2.683
5_H2	2.062	1.698	1.427	1.310	1.539	1.902	2.276	2.620	2.620
6_H1	2.327	2.255	2.003	2.068	2.232	2.504	2.937	3.515	3.515
6_H2	2.101	1.637	1.527	1.704	1.803	2.174	2.747	3.296	3.296
7_H1	1.603	1.660	1.616	1.381	1.611	1.729	2.103	2.501	2.501
7_H2	1.626	1.452	1.291	1.066	1.289	1.593	1.887	2.145	2.145
8_H1	2.270	1.747	1.679	1.458	1.789	2.564	3.386	3.987	3.987
8_H2	1.822	1.537	1.906	1.993	1.866	2.066	2.756	3.448	3.448
9_H1	3.795	3.065	2.419	2.479	3.100	3.684	4.442	5.330	5.330
9_H2	3.547	3.739	3.389	2.083	3.179	3.693	3.847	4.637	4.637
10_H1	3.092	2.516	2.500	2.693	2.865	3.599	4.907	6.186	6.186
10_H2	3.755	3.234	2.968	3.269	3.183	3.132	4.285	6.233	6.233
11_H1	2.046	2.079	2.040	1.754	1.836	1.839	2.543	3.218	3.218
11_H2	2.640	2.954	2.426	2.062	2.612	2.742	3.303	4.517	4.517

Min	1.603	1.452	1.291	1.066	1.289	1.593	1.887	2.145	2.145
Max	3.795	3.739	3.389	3.269	3.183	3.693	4.907	6.233	6.233
Mean	2.568	2.279	2.018	1.842	2.136	2.474	3.082	3.828	3.828
σ	0.700	0.634	0.529	0.505	0.552	0.619	0.788	1.107	1.107
Mean-σ	1.868	1.645	1.489	1.337	1.583	1.855	2.295	2.721	2.721
Mean+σ	3.268	2.913	2.547	2.347	2.688	3.093	3.870	4.935	4.935
Q1	2.071	1.710	1.632	1.480	1.792	2.087	2.692	3.238	3.238
Median	2.415	2.113	1.943	1.776	1.954	2.344	2.837	3.482	3.482
Q3	3.058	2.768	2.345	2.066	2.469	2.712	3.409	4.500	4.500

Table A.121 PFA results (Bldg: T3 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.451	2.658	2.085	1.751	2.379	3.151	4.044	5.125	5.125
1_H2	2.804	2.341	1.910	1.773	2.124	2.799	3.306	3.871	3.871
2_H1	2.551	2.349	2.144	1.881	2.202	2.448	2.826	3.519	3.519
2_H2	2.211	1.902	1.598	1.547	1.696	2.091	2.442	2.988	2.988
3_H1	2.207	2.070	1.996	1.915	2.011	1.988	2.376	2.889	2.889
3_H2	1.632	1.468	1.305	1.246	1.398	1.563	1.850	2.183	2.183
4_H1	3.780	2.872	2.797	2.616	2.776	3.450	4.470	5.734	5.734
4_H2	4.315	3.754	3.256	2.729	3.033	3.597	4.816	6.259	6.259
5_H1	2.679	2.596	2.406	1.833	2.177	2.383	3.166	4.078	4.078
5_H2	2.105	2.094	2.002	1.725	2.001	1.959	2.800	3.729	3.729
6_H1	1.931	1.687	1.417	1.335	1.560	1.752	2.071	2.521	2.521
6_H2	2.045	1.932	1.788	1.769	1.775	1.911	2.058	2.302	2.302
7_H1	1.792	1.616	1.415	1.265	1.556	1.744	2.101	2.531	2.531
7_H2	2.207	2.027	1.900	1.770	2.011	2.155	2.265	2.839	2.839
8_H1	2.785	2.223	1.644	1.287	1.664	2.265	3.120	3.942	3.942
8_H2	2.071	1.756	1.499	1.327	1.541	1.876	2.144	2.460	2.460
9_H1	2.918	2.490	2.309	2.371	2.784	3.495	4.323	5.580	5.580
9_H2	3.485	2.598	2.193	2.600	3.267	3.699	5.451	7.172	7.172
10_H1	2.546	2.266	1.986	2.014	2.157	2.317	3.155	4.199	4.199
10_H2	5.864	5.066	4.032	2.374	2.903	4.753	6.075	7.272	7.272
11_H1	4.427	3.574	2.782	2.885	2.652	3.438	4.208	4.980	4.980
11_H2	2.305	2.081	2.183	2.388	2.654	2.619	3.457	4.803	4.803

Min	1.632	1.468	1.305	1.246	1.398	1.563	1.850	2.183	2.183
Max	5.864	5.066	4.032	2.885	3.267	4.753	6.075	7.272	7.272
Mean	2.823	2.428	2.120	1.927	2.196	2.611	3.297	4.135	4.135
σ	1.031	0.818	0.646	0.508	0.543	0.829	1.187	1.554	1.554
Mean-σ	1.792	1.610	1.474	1.419	1.654	1.782	2.110	2.581	2.581
Mean+σ	3.855	3.246	2.766	2.436	2.739	3.440	4.483	5.689	5.689
Q1	2.130	1.956	1.680	1.592	1.716	1.966	2.293	2.852	2.852
Median	2.549	2.244	1.999	1.803	2.140	2.350	3.138	3.907	3.907
Q3	3.318	2.598	2.280	2.373	2.654	3.366	4.167	5.089	5.089

Table A.122 PFA results (Bldg: T3 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.980	2.479	1.977	1.826	2.255	2.979	3.507	3.903	3.903
1_H2	3.568	2.772	1.956	1.771	2.395	3.191	4.184	5.165	5.165
2_H1	2.374	2.305	1.918	1.569	1.883	2.407	2.881	3.377	3.377
2_H2	2.603	2.446	2.195	1.903	2.266	2.567	2.807	3.479	3.479
3_H1	1.844	1.695	1.442	1.267	1.537	1.715	1.967	2.340	2.340
3_H2	2.178	2.052	1.993	1.925	2.049	1.989	2.225	2.807	2.807
4_H1	4.598	4.164	3.497	2.861	3.202	4.059	5.092	6.619	6.619
4_H2	4.405	3.898	3.343	2.715	3.263	4.164	5.144	6.903	6.903
5_H1	2.110	2.189	2.049	1.788	2.194	2.220	2.840	3.938	3.938
5_H2	2.734	2.815	2.617	1.857	2.111	2.442	3.454	4.439	4.439
6_H1	1.994	1.794	1.776	1.801	1.724	1.820	2.150	2.413	2.413
6_H2	1.790	1.523	1.400	1.337	1.601	1.731	2.047	2.459	2.459
7_H1	2.277	2.129	1.881	1.726	2.000	2.228	2.465	3.146	3.146
7_H2	1.955	1.800	1.519	1.309	1.693	1.960	2.203	2.507	2.507
8_H1	2.051	1.785	1.422	1.270	1.576	1.844	2.290	2.644	2.644
8_H2	2.710	2.104	1.593	1.305	1.711	2.253	2.896	3.545	3.545
9_H1	3.578	2.548	2.274	2.532	3.223	3.752	5.002	6.501	6.501
9_H2	2.907	2.481	2.486	2.424	2.965	3.281	4.227	5.597	5.597
10_H1	5.877	4.847	3.692	2.330	2.819	4.654	5.967	6.758	6.758
10_H2	3.391	2.676	2.112	2.026	2.298	2.903	3.561	4.505	4.505
11_H1	2.629	2.205	2.228	2.618	2.913	2.709	3.312	4.634	4.634
11_H2	4.572	3.790	2.739	2.782	2.675	3.314	4.295	5.027	5.027

Min	1.790	1.523	1.400	1.267	1.537	1.715	1.967	2.340	2.340
Max	5.877	4.847	3.692	2.861	3.263	4.654	5.967	6.903	6.903
Mean	2.960	2.568	2.187	1.952	2.289	2.735	3.387	4.214	4.214
σ	1.084	0.868	0.653	0.521	0.571	0.852	1.170	1.523	1.523
Mean-σ	1.876	1.700	1.534	1.431	1.718	1.883	2.217	2.691	2.691
Mean+σ	4.045	3.436	2.840	2.473	2.860	3.588	4.557	5.737	5.737
Q1	2.127	2.065	1.802	1.608	1.764	2.046	2.334	2.892	2.892
Median	2.670	2.376	2.021	1.842	2.225	2.505	3.104	3.921	3.921
Q3	3.523	2.748	2.433	2.401	2.783	3.258	4.216	5.131	5.131

Table A.123 PFA results (Bldg: T4 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.722	1.542	1.715	1.650	1.565	1.857	2.269	2.853	2.853
1_H2	2.366	2.011	2.023	1.843	1.469	1.768	2.668	3.283	3.283
2_H1	1.370	1.206	1.368	1.390	1.252	1.314	1.665	2.232	2.232
2_H2	2.189	2.355	2.025	1.729	1.538	1.628	1.948	2.452	2.452
3_H1	1.860	1.711	1.641	1.351	1.565	1.871	2.486	2.981	2.981
3_H2	1.621	1.463	1.675	1.564	1.594	1.713	2.170	2.559	2.559
4_H1	1.686	1.237	1.099	1.106	1.473	1.789	2.181	2.633	2.633
4_H2	1.579	1.374	1.091	1.114	1.252	1.569	2.061	2.431	2.431
5_H1	1.644	1.434	1.205	1.080	1.296	1.557	1.768	2.131	2.131
5_H2	0.821	0.867	0.818	0.687	0.664	0.781	0.955	1.090	1.090
6_H1	1.802	1.542	1.599	1.401	1.397	1.623	2.218	2.879	2.879
6_H2	2.513	2.201	2.017	1.914	2.108	2.703	3.782	4.835	4.835
7_H1	2.501	2.016	1.957	1.654	1.460	1.860	2.616	3.436	3.436
7_H2	2.750	2.616	2.260	1.445	1.831	2.187	3.074	3.944	3.944
8_H1	4.346	3.786	3.608	2.299	2.157	2.768	4.034	5.259	5.259
8_H2	3.480	2.991	2.356	2.054	2.786	3.292	4.578	5.974	5.974
9_H1	2.186	1.783	1.391	1.120	1.637	2.331	2.915	3.354	3.354
9_H2	1.538	1.173	1.025	0.997	1.307	1.558	1.862	2.185	2.185
10_H1	1.809	1.438	1.224	1.133	1.276	1.700	2.016	2.286	2.286
10_H2	1.313	1.212	1.043	0.952	1.137	1.250	1.403	1.606	1.606
11_H1	1.556	1.364	1.228	1.351	1.452	1.719	2.182	2.613	2.613
11_H2	1.559	1.208	1.076	1.168	1.379	1.585	1.950	2.338	2.338

Min	0.821	0.867	0.818	0.687	0.664	0.781	0.955	1.090	1.090
Max	4.346	3.786	3.608	2.299	2.786	3.292	4.578	5.974	5.974
Mean	2.010	1.751	1.611	1.409	1.527	1.837	2.400	2.971	2.971
σ	0.773	0.692	0.628	0.397	0.420	0.547	0.855	1.160	1.160
Mean-σ	1.236	1.059	0.983	1.012	1.107	1.291	1.545	1.810	1.810
Mean+σ	2.783	2.443	2.239	1.806	1.947	2.384	3.255	4.131	4.131
Q1	1.564	1.269	1.125	1.116	1.299	1.573	1.948	2.299	2.299
Median	1.762	1.502	1.495	1.371	1.464	1.716	2.182	2.623	2.623
Q3	2.322	2.015	2.002	1.653	1.586	1.868	2.655	3.336	3.336

Table A.124 PFA results (Bldg: T4 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.371	2.121	2.073	1.668	1.531	1.783	2.451	3.032	3.032
1_H2	1.922	1.728	1.824	1.579	1.641	1.888	2.261	2.721	2.721
2_H1	2.127	2.333	2.046	1.660	1.525	1.588	1.942	2.336	2.336
2_H2	1.474	1.310	1.514	1.396	1.340	1.434	1.820	2.417	2.417
3_H1	1.876	1.652	1.566	1.448	1.681	1.926	2.348	2.807	2.807
3_H2	1.804	1.601	1.290	1.198	1.593	1.984	2.567	3.045	3.045
4_H1	1.660	1.436	1.106	1.091	1.330	1.671	2.100	2.400	2.400
4_H2	1.507	1.273	1.140	1.135	1.418	1.640	1.937	2.312	2.312
5_H1	0.931	0.944	0.864	0.676	0.730	0.868	0.965	1.137	1.137
5_H2	1.692	1.409	1.200	1.120	1.243	1.561	1.828	2.111	2.111
6_H1	2.634	2.066	1.982	2.103	2.255	2.682	3.686	4.743	4.743
6_H2	2.423	1.759	1.607	1.427	1.721	2.103	2.828	3.533	3.533
7_H1	2.908	2.800	2.250	1.550	1.921	2.425	3.603	4.649	4.649
7_H2	2.468	2.116	1.941	1.635	1.517	1.791	2.763	3.619	3.619
8_H1	3.257	2.555	2.200	2.023	2.395	2.957	4.346	5.624	5.624
8_H2	4.800	4.211	3.915	2.364	2.242	3.082	4.632	6.271	6.271
9_H1	1.699	1.328	1.100	1.169	1.422	1.634	2.002	2.319	2.319
9_H2	1.753	1.431	1.171	1.166	1.701	2.082	2.466	2.852	2.852
10_H1	1.425	1.205	0.977	0.940	1.048	1.353	1.553	1.672	1.672
10_H2	1.587	1.352	1.217	1.132	1.342	1.534	1.769	2.092	2.092
11_H1	1.632	1.319	1.087	1.103	1.413	1.700	1.950	2.278	2.278
11_H2	1.687	1.390	1.221	1.241	1.390	1.630	2.091	2.452	2.452

Min	0.931	0.944	0.864	0.676	0.730	0.868	0.965	1.137	1.137
Max	4.800	4.211	3.915	2.364	2.395	3.082	4.632	6.271	6.271
Mean	2.074	1.788	1.604	1.401	1.564	1.878	2.450	3.019	3.019
σ	0.814	0.719	0.673	0.401	0.387	0.522	0.900	1.270	1.270
Mean-σ	1.261	1.069	0.931	1.000	1.177	1.356	1.551	1.749	1.749
Mean+σ	2.888	2.507	2.277	1.802	1.950	2.400	3.350	4.289	4.289
Q1	1.639	1.334	1.148	1.133	1.354	1.598	1.938	2.314	2.314
Median	1.779	1.519	1.402	1.319	1.521	1.741	2.180	2.587	2.587
Q3	2.410	2.103	1.972	1.621	1.696	2.058	2.714	3.411	3.411

Table A.125 PFA results (Bldg: T4 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.257	1.795	1.824	1.819	1.853	2.072	2.540	3.056	3.056
1_H2	2.470	2.060	1.784	1.835	2.030	2.219	2.981	3.919	3.919
2_H1	3.276	2.389	1.946	1.519	2.276	2.522	3.283	4.339	4.339
2_H2	2.612	2.686	2.600	1.940	2.217	2.552	2.859	3.780	3.780
3_H1	3.106	2.635	2.179	1.915	1.999	2.441	3.561	4.302	4.302
3_H2	3.663	3.294	2.576	2.219	2.541	3.148	4.076	5.129	5.129
4_H1	2.555	2.124	1.563	1.445	1.916	2.606	3.019	3.282	3.282
4_H2	2.207	2.030	1.770	1.678	1.959	2.137	2.539	3.209	3.209
5_H1	2.342	1.910	1.444	1.442	1.620	2.100	2.493	2.780	2.780
5_H2	1.765	1.542	1.571	1.283	1.511	1.713	2.180	2.606	2.606
6_H1	2.258	1.752	1.583	1.721	1.820	2.232	2.970	3.814	3.814
6_H2	2.499	2.169	2.160	1.957	2.166	2.440	3.022	3.695	3.695
7_H1	1.858	1.541	1.318	1.131	1.307	1.768	2.227	2.575	2.575
7_H2	1.596	1.548	1.558	1.344	1.521	1.692	2.184	2.656	2.656
8_H1	1.675	1.638	1.923	2.139	2.022	1.981	2.399	3.052	3.052
8_H2	2.579	2.021	1.892	1.556	1.773	2.716	3.564	4.198	4.198
9_H1	3.547	3.798	3.277	1.985	2.963	3.421	3.446	4.434	4.434
9_H2	4.180	2.976	2.365	2.534	3.262	3.775	4.639	5.969	5.969
10_H1	4.663	3.729	3.256	3.514	3.446	3.228	4.963	6.993	6.993
10_H2	3.153	2.564	2.432	2.417	2.876	4.037	5.689	7.356	7.356
11_H1	2.697	2.628	2.268	1.882	2.136	2.533	3.678	4.799	4.799
11_H2	2.645	2.386	1.933	1.852	1.899	2.043	2.646	3.430	3.430

Min	1.596	1.541	1.318	1.131	1.307	1.692	2.180	2.575	2.575
Max	4.663	3.798	3.277	3.514	3.446	4.037	5.689	7.356	7.356
Mean	2.709	2.328	2.056	1.869	2.141	2.517	3.225	4.062	4.062
σ	0.791	0.665	0.533	0.511	0.561	0.646	0.934	1.329	1.329
Mean-σ	1.918	1.663	1.523	1.358	1.580	1.871	2.291	2.734	2.734
Mean+σ	3.500	2.993	2.588	2.380	2.703	3.163	4.159	5.391	5.391
Q1	2.257	1.824	1.629	1.528	1.828	2.079	2.539	3.094	3.094
Median	2.567	2.147	1.928	1.844	2.010	2.440	3.000	3.797	3.797
Q3	3.141	2.633	2.341	1.978	2.261	2.689	3.563	4.411	4.411

Table A.126 PFA results (Bldg: T4 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.569	2.182	2.024	1.933	1.983	2.412	2.957	3.486	3.486
1_H2	2.512	2.006	1.786	1.624	2.086	2.279	2.923	3.562	3.562
2_H1	2.581	2.743	2.628	1.996	2.327	2.705	2.803	3.604	3.604
2_H2	2.964	2.211	2.035	1.686	2.169	2.469	3.276	3.975	3.975
3_H1	3.183	2.867	2.339	1.958	2.368	2.958	4.077	4.921	4.921
3_H2	3.635	2.918	2.206	1.772	2.012	2.423	3.600	4.434	4.434
4_H1	2.490	2.121	1.786	1.685	1.925	2.211	2.710	3.287	3.287
4_H2	2.470	1.987	1.421	1.475	1.733	2.310	2.778	3.084	3.084
5_H1	1.799	1.630	1.541	1.304	1.626	1.956	2.455	2.947	2.947
5_H2	2.152	1.732	1.450	1.330	1.488	1.965	2.399	2.702	2.702
6_H1	2.468	2.163	1.939	2.108	2.196	2.541	3.101	3.640	3.640
6_H2	2.047	1.743	1.602	1.660	1.836	2.306	2.767	3.287	3.287
7_H1	1.822	1.595	1.575	1.362	1.526	1.750	2.240	2.628	2.628
7_H2	1.809	1.500	1.303	1.057	1.338	1.562	2.074	2.456	2.456
8_H1	2.267	1.729	1.642	1.541	1.901	2.569	3.267	3.923	3.923
8_H2	1.881	1.581	1.948	2.023	1.809	2.070	2.761	3.441	3.441
9_H1	3.715	3.150	2.470	2.544	3.208	3.755	4.518	5.062	5.062
9_H2	3.920	3.796	3.430	2.136	3.406	3.954	4.413	5.336	5.336
10_H1	2.931	2.362	2.429	2.890	3.007	3.953	5.032	6.198	6.198
10_H2	3.850	3.335	2.879	3.352	3.326	3.216	4.356	6.268	6.268
11_H1	2.151	2.096	2.023	1.857	1.753	1.847	2.652	3.427	3.427
11_H2	2.671	2.854	2.384	2.025	2.521	2.902	3.239	4.234	4.234

Min	1.799	1.500	1.303	1.057	1.338	1.562	2.074	2.456	2.456
Max	3.920	3.796	3.430	3.352	3.406	3.954	5.032	6.268	6.268
Mean	2.631	2.286	2.038	1.878	2.161	2.551	3.200	3.905	3.905
σ	0.671	0.640	0.525	0.529	0.598	0.674	0.806	1.071	1.071
Mean-σ	1.960	1.646	1.513	1.350	1.563	1.877	2.394	2.834	2.834
Mean+σ	3.302	2.926	2.563	2.407	2.759	3.224	4.006	4.975	4.975
Q1	2.151	1.734	1.612	1.562	1.767	2.106	2.723	3.287	3.287
Median	2.501	2.142	1.985	1.814	1.998	2.417	2.940	3.583	3.583
Q3	2.956	2.827	2.373	2.024	2.357	2.852	3.519	4.384	4.384

Table A.127 PFA results (Bldg: T4 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.622	2.826	1.990	1.662	2.460	3.124	4.149	5.077	5.077
1_H2	2.800	2.387	1.917	1.867	2.098	2.816	3.319	3.859	3.859
2_H1	2.612	2.555	2.357	2.004	2.213	2.456	3.165	3.939	3.939
2_H2	2.202	1.903	1.616	1.589	1.764	2.112	2.444	3.150	3.150
3_H1	2.376	2.092	1.973	1.980	2.051	2.068	2.532	3.076	3.076
3_H2	1.751	1.454	1.300	1.290	1.440	1.728	1.926	2.234	2.234
4_H1	3.948	2.940	3.100	2.661	2.942	3.546	4.767	5.797	5.797
4_H2	4.655	3.821	3.798	3.337	3.094	3.710	5.202	6.727	6.727
5_H1	2.680	2.572	2.436	1.967	2.164	2.449	3.393	4.107	4.107
5_H2	2.033	2.194	2.095	1.823	2.178	2.059	2.872	3.786	3.786
6_H1	1.988	1.756	1.475	1.367	1.620	1.786	2.097	2.589	2.589
6_H2	2.121	2.034	1.945	1.869	1.861	1.938	2.134	2.353	2.353
7_H1	1.801	1.631	1.464	1.306	1.576	1.817	2.130	2.532	2.532
7_H2	2.333	2.073	1.897	1.927	2.136	2.219	2.357	2.859	2.859
8_H1	3.322	2.489	1.824	1.309	1.691	2.484	3.363	4.166	4.166
8_H2	2.219	1.875	1.531	1.303	1.637	1.966	2.263	2.635	2.635
9_H1	3.087	2.655	2.453	2.596	3.150	3.968	5.060	6.506	6.506
9_H2	4.141	3.392	2.293	2.603	3.143	3.912	6.127	7.963	7.963
10_H1	2.704	2.260	1.982	2.127	2.267	2.604	3.645	4.899	4.899
10_H2	5.883	5.222	3.950	2.495	2.875	4.425	6.113	7.446	7.446
11_H1	4.114	3.577	3.009	2.982	2.774	3.449	4.269	5.328	5.328
11_H2	2.257	2.089	2.134	2.396	2.718	2.768	3.867	5.368	5.368

Min	1.751	1.454	1.300	1.290	1.440	1.728	1.926	2.234	2.234
Max	5.883	5.222	3.950	3.337	3.150	4.425	6.127	7.963	7.963
Mean	2.939	2.536	2.206	2.021	2.266	2.700	3.509	4.382	4.382
σ	1.061	0.858	0.705	0.578	0.552	0.810	1.300	1.715	1.715
Mean-σ	1.877	1.678	1.501	1.443	1.714	1.890	2.209	2.667	2.667
Mean+σ	4.000	3.394	2.911	2.599	2.818	3.511	4.809	6.097	6.097
Q1	2.206	2.044	1.842	1.608	1.788	2.061	2.379	2.913	2.913
Median	2.646	2.324	1.986	1.947	2.171	2.470	3.341	4.023	4.023
Q3	3.547	2.784	2.417	2.470	2.760	3.368	4.239	5.358	5.358

Table A.128 PFA results (Bldg: T4 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.981	2.479	2.090	1.867	2.268	3.047	3.684	4.157	4.157
1_H2	3.481	2.697	1.880	1.741	2.446	3.198	4.201	5.201	5.201
2_H1	2.472	2.339	1.910	1.624	1.955	2.537	3.009	3.441	3.441
2_H2	2.672	2.477	2.216	1.879	2.335	2.655	2.859	3.569	3.569
3_H1	1.858	1.739	1.516	1.310	1.596	1.798	2.022	2.317	2.317
3_H2	2.137	2.064	1.969	1.907	2.044	2.002	2.353	2.808	2.808
4_H1	4.494	4.130	3.490	2.975	3.179	4.151	4.899	6.597	6.597
4_H2	4.397	3.623	3.278	3.324	3.699	4.223	5.555	7.254	7.254
5_H1	2.098	2.209	2.083	1.817	2.230	2.308	2.805	3.968	3.968
5_H2	2.861	2.832	2.621	1.866	2.123	2.562	3.536	4.378	4.378
6_H1	1.937	1.850	1.808	1.822	1.778	1.922	2.076	2.255	2.255
6_H2	1.807	1.503	1.391	1.320	1.528	1.698	2.067	2.453	2.453
7_H1	2.425	2.248	1.984	1.804	2.086	2.304	2.574	3.248	3.248
7_H2	1.945	1.793	1.532	1.323	1.674	1.930	2.193	2.460	2.460
8_H1	2.165	1.894	1.497	1.299	1.554	1.890	2.325	2.655	2.655
8_H2	2.633	2.049	1.637	1.306	1.852	2.424	3.019	3.654	3.654
9_H1	3.732	2.519	2.333	2.607	3.410	3.991	4.743	6.203	6.203
9_H2	2.957	2.431	2.401	2.245	2.899	3.178	4.513	5.938	5.938
10_H1	5.733	4.770	3.601	2.385	2.913	4.690	6.083	6.988	6.988
10_H2	3.893	3.231	2.482	2.028	2.607	3.319	3.680	4.648	4.648
11_H1	2.940	2.333	2.260	2.692	3.140	2.944	3.469	4.794	4.794
11_H2	4.699	3.901	2.868	2.918	2.852	3.479	4.612	5.385	5.385

Min	1.807	1.503	1.391	1.299	1.528	1.698	2.022	2.255	2.255
Max	5.733	4.770	3.601	3.324	3.699	4.690	6.083	7.254	7.254
Mean	3.014	2.596	2.220	2.003	2.371	2.830	3.467	4.290	4.290
σ	1.073	0.845	0.632	0.591	0.636	0.871	1.197	1.584	1.584
Mean-σ	1.941	1.751	1.588	1.411	1.735	1.959	2.270	2.706	2.706
Mean+σ	4.088	3.441	2.852	2.594	3.007	3.700	4.664	5.873	5.873
Q1	2.144	2.053	1.826	1.653	1.878	2.078	2.408	2.918	2.918
Median	2.766	2.385	2.086	1.867	2.249	2.609	3.244	4.062	4.062
Q3	3.669	2.799	2.462	2.350	2.888	3.289	4.435	5.339	5.339

Table A.129 PFA results (Bldg: U1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.722	1.549	1.537	1.363	1.493	1.788	2.248	2.813	2.813
1_H2	2.546	2.039	1.992	1.503	1.349	1.867	2.818	3.429	3.429
2_H1	1.203	1.060	1.172	1.276	1.106	1.086	1.416	1.824	1.824
2_H2	1.944	1.991	1.627	1.309	1.399	1.452	1.903	2.367	2.367
3_H1	1.645	1.369	1.195	1.085	1.542	1.880	2.282	2.696	2.696
3_H2	1.670	1.436	1.424	1.264	1.548	1.635	2.081	2.506	2.506
4_H1	1.364	1.125	1.051	0.964	1.188	1.394	1.696	2.065	2.065
4_H2	1.346	1.118	1.028	0.986	1.196	1.413	1.674	1.985	1.985
5_H1	1.580	1.293	1.113	1.024	1.228	1.495	1.752	2.055	2.055
5_H2	0.699	0.724	0.706	0.672	0.773	0.770	0.855	0.970	0.970
6_H1	1.788	1.562	1.498	1.282	1.442	1.731	2.270	2.910	2.910
6_H2	2.234	1.961	1.604	1.659	1.787	2.016	3.078	4.021	4.021
7_H1	1.994	1.924	1.753	1.452	1.492	1.779	2.373	3.104	3.104
7_H2	2.484	2.448	2.027	1.227	1.649	2.150	3.020	3.707	3.707
8_H1	3.978	3.768	3.435	2.037	2.210	2.749	4.120	5.302	5.302
8_H2	2.769	2.201	1.944	1.839	2.115	2.438	3.736	4.899	4.899
9_H1	1.742	1.385	1.178	1.048	1.519	1.852	2.188	2.546	2.546
9_H2	1.216	1.072	0.970	0.898	1.083	1.294	1.414	1.531	1.531
10_H1	1.587	1.286	1.152	1.106	1.229	1.438	1.735	2.063	2.063
10_H2	1.179	1.033	0.879	0.819	0.950	1.166	1.290	1.385	1.385
11_H1	1.616	1.312	1.217	1.173	1.281	1.516	1.935	2.306	2.306
11_H2	1.331	1.110	1.037	1.008	1.181	1.348	1.596	1.890	1.890

Min	0.699	0.724	0.706	0.672	0.773	0.770	0.855	0.970	0.970
Max	3.978	3.768	3.435	2.037	2.210	2.749	4.120	5.302	5.302
Mean	1.802	1.580	1.434	1.227	1.398	1.648	2.158	2.653	2.653
σ	0.692	0.659	0.579	0.327	0.341	0.447	0.794	1.083	1.083
Mean-σ	1.110	0.921	0.854	0.900	1.057	1.201	1.365	1.570	1.570
Mean+σ	2.493	2.239	2.013	1.554	1.740	2.094	2.952	3.737	3.737
Q1	1.350	1.120	1.066	1.012	1.190	1.399	1.680	2.003	2.003
Median	1.657	1.377	1.206	1.200	1.374	1.576	2.008	2.437	2.437
Q3	1.982	1.952	1.621	1.350	1.536	1.863	2.351	3.056	3.056

Table A.130 PFA results (Bldg: U1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	1.872	1.714	1.834	1.685	1.447	1.691	2.120	2.709	2.709
1_H2	1.780	1.523	1.569	1.480	1.467	1.688	2.045	2.316	2.316
2_H1	1.562	1.698	1.700	1.463	1.447	1.519	1.847	2.335	2.335
2_H2	1.243	1.130	1.310	1.374	1.212	1.233	1.606	2.150	2.150
3_H1	1.621	1.387	1.429	1.322	1.475	1.601	2.086	2.527	2.527
3_H2	1.617	1.398	1.308	1.077	1.388	1.732	2.304	2.739	2.739
4_H1	1.398	1.248	1.051	1.012	1.169	1.425	1.858	2.170	2.170
4_H2	1.545	1.195	1.087	0.987	1.329	1.582	1.909	2.307	2.307
5_H1	0.845	0.875	0.853	0.749	0.774	0.869	1.011	1.131	1.131
5_H2	1.508	1.250	1.109	1.026	1.205	1.381	1.708	2.027	2.027
6_H1	2.293	1.871	2.042	1.785	2.054	2.403	3.362	4.493	4.493
6_H2	1.894	1.504	1.510	1.432	1.520	1.691	2.273	2.662	2.662
7_H1	2.450	2.383	2.070	1.370	1.526	1.956	2.845	3.544	3.544
7_H2	2.150	2.020	1.846	1.492	1.467	1.873	2.364	3.065	3.065
8_H1	2.827	2.319	2.016	1.978	2.339	2.756	3.909	5.116	5.116
8_H2	4.318	3.620	3.387	1.940	2.037	2.910	3.696	4.612	4.612
9_H1	1.469	1.240	1.015	0.925	1.206	1.466	1.796	2.087	2.087
9_H2	1.974	1.665	1.248	1.080	1.642	2.132	2.636	3.100	3.100
10_H1	1.240	1.133	1.005	0.896	1.049	1.171	1.414	1.609	1.609
10_H2	1.560	1.300	1.137	1.097	1.201	1.445	1.706	2.046	2.046
11_H1	1.454	1.182	1.063	1.004	1.245	1.472	1.729	2.026	2.026
11_H2	1.648	1.372	1.175	1.167	1.340	1.571	2.016	2.414	2.414

Min	0.845	0.875	0.853	0.749	0.774	0.869	1.011	1.131	1.131
Max	4.318	3.620	3.387	1.978	2.339	2.910	3.909	5.116	5.116
Mean	1.830	1.592	1.489	1.288	1.434	1.708	2.193	2.690	2.690
σ	0.707	0.594	0.565	0.344	0.349	0.486	0.718	0.981	0.981
Mean-σ	1.124	0.998	0.924	0.944	1.085	1.221	1.475	1.709	1.709
Mean+σ	2.537	2.186	2.055	1.632	1.782	2.194	2.910	3.671	3.671
Q1	1.479	1.242	1.092	1.016	1.207	1.451	1.746	2.103	2.103
Median	1.619	1.392	1.309	1.245	1.417	1.592	2.030	2.375	2.375
Q3	1.954	1.710	1.801	1.475	1.509	1.838	2.349	2.984	2.984

Table A.131 PFA results (Bldg: U1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.014	1.663	1.629	1.467	1.829	1.910	2.402	2.967	2.967
1_H2	2.264	1.898	1.482	1.564	1.552	2.001	2.632	3.199	3.199
2_H1	2.675	2.094	1.811	1.505	1.960	2.216	2.911	3.472	3.472
2_H2	2.454	2.465	2.421	1.808	2.234	2.512	2.741	3.703	3.703
3_H1	2.555	2.284	1.856	1.475	1.612	2.270	3.293	3.999	3.999
3_H2	2.855	2.422	1.769	1.686	2.030	2.640	3.468	4.362	4.362
4_H1	1.809	1.678	1.391	1.308	1.577	1.888	2.033	2.211	2.211
4_H2	2.038	1.830	1.662	1.510	1.712	1.940	2.192	2.734	2.734
5_H1	1.739	1.523	1.267	1.304	1.577	1.981	2.278	2.472	2.472
5_H2	1.687	1.618	1.514	1.265	1.621	1.820	2.082	2.512	2.512
6_H1	1.647	1.450	1.348	1.325	1.458	1.843	2.226	2.641	2.641
6_H2	2.191	1.936	1.775	1.748	2.100	2.288	2.749	3.230	3.230
7_H1	1.640	1.428	1.139	1.020	1.175	1.458	1.670	1.930	1.930
7_H2	1.663	1.529	1.347	1.195	1.529	1.774	1.969	2.305	2.305
8_H1	1.554	1.451	1.749	1.741	1.600	1.634	2.101	2.607	2.607
8_H2	2.060	1.589	1.491	1.265	1.594	2.262	3.028	3.595	3.595
9_H1	3.108	3.473	3.061	1.713	2.732	3.186	3.201	3.759	3.759
9_H2	2.699	2.255	1.856	2.232	2.424	2.550	3.042	4.054	4.054
10_H1	2.309	2.798	2.763	2.857	2.641	2.760	3.736	5.171	5.171
10_H2	1.959	1.833	2.053	2.247	2.321	2.566	3.795	5.226	5.226
11_H1	2.182	2.450	2.020	1.720	1.940	2.325	2.873	3.671	3.671
11_H2	1.765	1.697	1.722	1.533	1.557	1.737	2.399	3.051	3.051

Min	1.554	1.428	1.139	1.020	1.175	1.458	1.670	1.930	1.930
Max	3.108	3.473	3.061	2.857	2.732	3.186	3.795	5.226	5.226
Mean	2.130	1.971	1.778	1.613	1.853	2.162	2.674	3.312	3.312
σ	0.442	0.517	0.470	0.411	0.409	0.420	0.593	0.895	0.895
Mean-σ	1.688	1.454	1.308	1.202	1.445	1.742	2.081	2.418	2.418
Mean+σ	2.573	2.488	2.249	2.024	2.262	2.582	3.267	4.207	4.207
Q1	1.746	1.596	1.484	1.312	1.577	1.854	2.200	2.615	2.615
Median	2.049	1.831	1.736	1.521	1.667	2.108	2.686	3.215	3.215
Q3	2.418	2.276	1.856	1.736	2.083	2.466	3.039	3.745	3.745

Table A.132 PFA results (Bldg: U1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	1.882	1.703	1.572	1.558	1.600	1.806	2.225	2.862	2.862
1_H2	1.911	1.630	1.523	1.505	1.666	1.936	2.317	2.973	2.973
2_H1	2.299	2.404	2.282	1.669	2.089	2.415	2.505	3.188	3.188
2_H2	3.084	2.404	1.673	1.386	2.093	2.247	3.206	4.036	4.036
3_H1	3.288	2.867	2.107	1.848	2.329	2.924	3.322	4.164	4.164
3_H2	3.219	2.525	2.033	1.747	1.868	2.372	3.276	4.038	4.038
4_H1	2.154	1.915	1.722	1.534	1.707	2.005	2.291	2.919	2.919
4_H2	2.390	1.864	1.348	1.351	1.795	2.416	2.754	3.024	3.024
5_H1	1.555	1.374	1.414	1.227	1.424	1.519	1.851	2.238	2.238
5_H2	1.854	1.592	1.318	1.362	1.500	1.904	2.243	2.539	2.539
6_H1	2.095	1.862	1.820	1.719	2.100	2.208	2.685	3.242	3.242
6_H2	2.013	1.522	1.528	1.466	1.530	1.920	2.520	3.138	3.138
7_H1	1.648	1.565	1.527	1.333	1.541	1.625	2.117	2.514	2.514
7_H2	1.670	1.441	1.206	1.056	1.208	1.563	1.949	2.272	2.272
8_H1	2.120	1.514	1.591	1.373	1.696	2.333	3.130	3.761	3.761
8_H2	1.610	1.475	1.772	1.901	1.714	1.685	2.293	2.959	2.959
9_H1	3.419	2.533	2.082	2.223	2.677	3.196	3.905	5.007	5.007
9_H2	2.793	3.215	3.115	1.960	2.624	2.899	3.115	3.835	3.835
10_H1	2.864	2.198	2.109	2.504	2.737	3.141	4.356	5.703	5.703
10_H2	3.325	3.250	2.894	3.145	2.577	2.608	4.213	5.800	5.800
11_H1	2.315	1.938	1.691	1.647	1.653	1.837	2.390	3.055	3.055
11_H2	2.312	2.340	1.995	1.798	2.079	2.180	3.138	4.337	4.337

Min	1.555	1.374	1.206	1.056	1.208	1.519	1.851	2.238	2.238
Max	3.419	3.250	3.115	3.145	2.737	3.196	4.356	5.800	5.800
Mean	2.355	2.052	1.833	1.696	1.919	2.215	2.809	3.528	3.528
σ	0.609	0.571	0.478	0.463	0.440	0.499	0.706	1.008	1.008
Mean-σ	1.746	1.480	1.355	1.233	1.478	1.717	2.103	2.520	2.520
Mean+σ	2.965	2.623	2.311	2.159	2.359	2.714	3.515	4.535	4.535
Q1	1.889	1.572	1.528	1.376	1.613	1.854	2.291	2.929	2.929
Median	2.226	1.889	1.707	1.603	1.755	2.194	2.602	3.163	3.163
Q3	2.846	2.404	2.070	1.835	2.099	2.416	3.189	4.037	4.037

Table A.133 PFA results (Bldg: U1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.918	2.232	1.723	1.401	2.008	2.886	3.885	4.791	4.791
1_H2	2.387	2.040	1.887	1.798	2.035	2.482	3.068	3.780	3.780
2_H1	2.364	2.104	1.816	1.865	2.176	2.463	2.696	3.181	3.181
2_H2	2.139	1.863	1.519	1.425	1.683	2.069	2.382	2.789	2.789
3_H1	1.933	1.830	1.768	1.872	1.911	2.077	2.281	2.425	2.425
3_H2	1.601	1.411	1.247	1.166	1.369	1.568	1.868	2.207	2.207
4_H1	3.287	2.667	2.493	2.611	2.250	3.067	4.297	5.377	5.377
4_H2	3.926	3.215	2.860	2.506	2.599	3.532	4.641	6.400	6.400
5_H1	2.513	2.571	2.309	1.753	1.985	2.347	2.854	3.527	3.527
5_H2	2.084	2.007	1.875	1.685	1.818	1.874	2.738	3.648	3.648
6_H1	1.799	1.452	1.178	1.225	1.439	1.725	2.002	2.390	2.390
6_H2	2.100	1.949	1.784	1.815	2.023	2.199	2.330	2.421	2.421
7_H1	1.811	1.603	1.419	1.308	1.600	1.833	2.098	2.549	2.549
7_H2	2.191	2.063	1.922	1.804	1.992	2.122	2.251	2.700	2.700
8_H1	2.097	1.584	1.333	1.236	1.512	1.912	2.394	3.006	3.006
8_H2	1.782	1.444	1.310	1.310	1.479	1.761	2.047	2.267	2.267
9_H1	2.480	2.060	2.172	2.130	2.097	2.582	3.574	4.572	4.572
9_H2	2.450	1.997	2.173	2.572	2.973	3.011	4.133	5.561	5.561
10_H1	2.372	1.875	1.711	1.642	1.734	2.022	2.852	3.525	3.525
10_H2	5.056	3.958	3.210	2.268	2.780	4.356	5.338	6.470	6.470
11_H1	3.803	2.907	2.593	2.634	2.590	3.122	4.184	4.849	4.849
11_H2	1.977	1.959	1.815	2.012	2.043	2.124	2.771	3.472	3.472

Min	1.601	1.411	1.178	1.166	1.369	1.568	1.868	2.207	2.207
Max	5.056	3.958	3.210	2.634	2.973	4.356	5.338	6.470	6.470
Mean	2.503	2.127	1.914	1.820	2.004	2.415	3.031	3.723	3.723
σ	0.837	0.616	0.530	0.473	0.434	0.678	0.980	1.341	1.341
Mean-σ	1.666	1.511	1.385	1.347	1.570	1.737	2.051	2.382	2.382
Mean+σ	3.340	2.743	2.444	2.293	2.439	3.094	4.011	5.065	5.065
Q1	2.004	1.839	1.567	1.407	1.696	1.939	2.293	2.587	2.587
Median	2.277	2.002	1.816	1.801	2.000	2.162	2.754	3.499	3.499
Q3	2.505	2.200	2.173	2.100	2.156	2.810	3.808	4.737	4.737

Table A.134 PFA results (Bldg: U1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.397	2.117	1.893	1.811	1.966	2.460	2.825	3.368	3.368
1_H2	3.317	2.648	1.903	1.564	2.218	2.986	3.889	4.705	4.705
2_H1	1.859	1.830	1.625	1.416	1.578	1.962	2.324	2.766	2.766
2_H2	2.248	2.141	1.964	1.907	2.201	2.389	2.526	3.041	3.041
3_H1	1.572	1.380	1.243	1.212	1.375	1.481	1.730	1.930	1.930
3_H2	2.069	1.917	1.772	1.892	1.931	2.124	2.398	2.596	2.596
4_H1	4.013	3.582	3.290	2.739	2.933	3.416	4.391	5.406	5.406
4_H2	3.903	3.041	3.618	2.449	3.260	3.064	4.604	5.941	5.941
5_H1	2.074	1.963	1.909	1.660	1.810	1.872	2.739	3.403	3.403
5_H2	2.225	2.203	2.239	1.823	2.098	2.156	3.065	3.815	3.815
6_H1	2.076	2.000	1.873	1.865	2.039	2.171	2.267	2.350	2.350
6_H2	1.769	1.571	1.291	1.258	1.485	1.704	2.029	2.547	2.547
7_H1	2.191	2.096	1.951	1.753	1.968	2.203	2.419	2.663	2.663
7_H2	1.729	1.623	1.398	1.353	1.628	1.841	1.998	2.329	2.329
8_H1	1.947	1.649	1.380	1.293	1.577	1.902	2.165	2.416	2.416
8_H2	2.695	2.127	1.499	1.207	1.702	2.296	3.105	3.727	3.727
9_H1	2.976	2.400	2.535	2.571	3.101	3.240	4.855	6.468	6.468
9_H2	2.943	2.521	2.256	2.204	2.503	2.874	3.830	5.059	5.059
10_H1	5.168	4.527	3.709	2.275	2.761	4.511	5.250	6.021	6.021
10_H2	2.559	1.948	1.916	1.851	2.200	2.367	3.167	4.202	4.202
11_H1	1.941	1.810	1.903	2.070	2.216	2.346	2.946	4.001	4.001
11_H2	4.056	3.253	2.949	2.679	2.494	2.874	3.728	4.496	4.496

Min	1.572	1.380	1.243	1.207	1.375	1.481	1.730	1.930	1.930
Max	5.168	4.527	3.709	2.739	3.260	4.511	5.250	6.468	6.468
Mean	2.624	2.288	2.096	1.857	2.139	2.465	3.102	3.784	3.784
σ	0.936	0.742	0.712	0.476	0.525	0.688	1.003	1.350	1.350
Mean-σ	1.688	1.546	1.384	1.381	1.613	1.777	2.100	2.434	2.434
Mean+σ	3.560	3.031	2.808	2.333	2.664	3.153	4.105	5.134	5.134
Q1	1.978	1.852	1.662	1.453	1.729	2.003	2.342	2.613	2.613
Median	2.237	2.107	1.906	1.837	2.069	2.321	2.885	3.565	3.565
Q3	2.968	2.490	2.252	2.170	2.425	2.874	3.805	4.653	4.653

Table A.135 PFA results (Bldg: U2 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.773	1.556	1.662	1.466	1.534	1.755	2.115	2.675	2.675
1_H2	2.305	1.893	1.930	1.647	1.416	1.699	2.587	3.162	3.162
2_H1	1.212	1.080	1.312	1.303	1.162	1.137	1.483	1.984	1.984
2_H2	1.793	1.908	1.675	1.394	1.430	1.488	1.831	2.273	2.273
3_H1	1.681	1.468	1.327	1.083	1.451	1.802	2.362	2.838	2.838
3_H2	1.625	1.382	1.456	1.327	1.533	1.555	2.062	2.510	2.510
4_H1	1.437	1.159	1.087	0.988	1.268	1.479	1.782	2.182	2.182
4_H2	1.445	1.182	1.022	1.000	1.200	1.463	1.818	2.089	2.089
5_H1	1.575	1.355	1.164	1.049	1.229	1.566	1.731	2.042	2.042
5_H2	0.698	0.786	0.770	0.689	0.743	0.815	0.939	1.066	1.066
6_H1	1.720	1.599	1.509	1.321	1.457	1.702	2.101	2.655	2.655
6_H2	2.445	2.135	1.841	1.735	1.914	2.330	3.396	4.500	4.500
7_H1	2.061	1.929	1.774	1.477	1.492	1.856	2.378	3.144	3.144
7_H2	2.428	2.451	2.077	1.296	1.492	2.011	3.008	3.732	3.732
8_H1	4.180	3.683	3.413	2.068	2.121	2.887	3.935	5.122	5.122
8_H2	2.916	2.374	2.046	1.907	2.273	2.708	3.867	5.102	5.102
9_H1	2.002	1.550	1.092	1.027	1.475	2.001	2.579	3.029	3.029
9_H2	1.375	1.143	1.006	0.914	1.146	1.398	1.642	1.867	1.867
10_H1	1.612	1.341	1.159	1.105	1.236	1.460	1.739	2.098	2.098
10_H2	1.247	1.084	0.961	0.821	0.945	1.195	1.372	1.520	1.520
11_H1	1.634	1.346	1.199	1.183	1.322	1.531	1.989	2.389	2.389
11_H2	1.366	1.128	1.050	1.024	1.211	1.374	1.617	1.919	1.919

Min	0.698	0.786	0.770	0.689	0.743	0.815	0.939	1.066	1.066
Max	4.180	3.683	3.413	2.068	2.273	2.887	3.935	5.122	5.122
Mean	1.842	1.615	1.479	1.265	1.411	1.691	2.197	2.723	2.723
σ	0.714	0.636	0.575	0.349	0.347	0.482	0.776	1.071	1.071
Mean-σ	1.128	0.979	0.904	0.915	1.065	1.210	1.421	1.651	1.651
Mean+σ	2.556	2.251	2.053	1.614	1.758	2.173	2.973	3.794	3.794
Q1	1.439	1.165	1.088	1.025	1.216	1.461	1.733	2.053	2.053
Median	1.657	1.425	1.320	1.240	1.423	1.560	2.025	2.449	2.449
Q3	2.046	1.904	1.749	1.448	1.492	1.842	2.529	3.116	3.116

Table A.136 PFA results (Bldg: U2 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.305	1.912	1.954	1.593	1.417	1.693	2.527	3.212	3.212
1_H2	1.831	1.602	1.659	1.487	1.486	1.765	2.083	2.541	2.541
2_H1	1.720	1.832	1.653	1.396	1.460	1.529	1.846	2.347	2.347
2_H2	1.272	1.152	1.285	1.339	1.236	1.251	1.649	2.155	2.155
3_H1	1.723	1.441	1.459	1.319	1.558	1.665	2.184	2.636	2.636
3_H2	1.655	1.470	1.274	1.062	1.450	1.887	2.385	2.806	2.806
4_H1	1.493	1.280	1.053	0.994	1.189	1.541	1.898	2.142	2.142
4_H2	1.444	1.188	1.093	0.995	1.280	1.490	1.787	2.177	2.177
5_H1	0.774	0.795	0.768	0.698	0.749	0.832	0.943	1.018	1.018
5_H2	1.590	1.322	1.095	1.041	1.206	1.477	1.761	2.090	2.090
6_H1	2.467	2.051	1.842	1.785	1.938	2.338	3.432	4.519	4.519
6_H2	2.109	1.641	1.582	1.332	1.551	1.797	2.475	2.985	2.985
7_H1	2.464	2.440	2.056	1.292	1.549	2.079	3.025	3.730	3.730
7_H2	2.110	2.031	1.840	1.488	1.485	1.846	2.459	3.183	3.183
8_H1	2.858	2.244	2.001	1.950	2.216	2.613	3.869	5.058	5.058
8_H2	4.417	3.760	3.454	1.994	2.131	2.930	4.149	5.293	5.293
9_H1	1.594	1.268	1.037	0.917	1.175	1.543	1.902	2.158	2.158
9_H2	2.012	1.581	1.133	1.019	1.429	2.000	2.599	3.030	3.030
10_H1	1.242	1.106	0.981	0.846	0.994	1.222	1.372	1.552	1.552
10_H2	1.580	1.297	1.153	1.111	1.228	1.464	1.734	2.068	2.068
11_H1	1.440	1.209	1.078	1.013	1.235	1.449	1.677	1.955	1.955
11_H2	1.679	1.360	1.199	1.164	1.290	1.527	1.997	2.388	2.388

Min	0.774	0.795	0.768	0.698	0.749	0.832	0.943	1.018	1.018
Max	4.417	3.760	3.454	1.994	2.216	2.930	4.149	5.293	5.293
Mean	1.899	1.636	1.484	1.265	1.420	1.724	2.262	2.775	2.775
σ	0.734	0.625	0.579	0.347	0.338	0.466	0.785	1.072	1.072
Mean-σ	1.165	1.011	0.905	0.919	1.082	1.259	1.477	1.703	1.703
Mean+σ	2.633	2.260	2.063	1.612	1.759	2.190	3.046	3.847	3.847
Q1	1.515	1.271	1.093	1.015	1.229	1.480	1.768	2.146	2.146
Median	1.699	1.455	1.279	1.228	1.423	1.604	2.040	2.465	2.465
Q3	2.109	1.892	1.795	1.465	1.533	1.877	2.514	3.145	3.145

Table A.137 PFA results (Bldg: U2 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.012	1.693	1.611	1.470	1.797	1.996	2.352	2.972	2.972
1_H2	2.240	1.958	1.546	1.602	1.564	1.988	2.475	2.994	2.994
2_H1	2.930	2.245	1.845	1.456	2.037	2.292	3.061	3.852	3.852
2_H2	2.370	2.477	2.410	1.794	2.260	2.481	2.683	3.568	3.568
3_H1	2.713	2.355	1.984	1.614	1.726	2.410	3.415	4.060	4.060
3_H2	3.015	2.684	1.960	1.747	2.235	2.813	3.328	4.248	4.248
4_H1	2.184	1.895	1.435	1.342	1.714	2.211	2.434	2.596	2.596
4_H2	2.037	1.869	1.695	1.518	1.737	1.973	2.166	2.754	2.754
5_H1	1.846	1.620	1.332	1.352	1.600	2.112	2.502	2.765	2.765
5_H2	1.612	1.615	1.583	1.311	1.614	1.738	2.007	2.394	2.394
6_H1	1.705	1.500	1.404	1.367	1.481	1.796	2.380	2.814	2.814
6_H2	2.196	1.972	1.792	1.751	2.157	2.294	2.881	3.473	3.473
7_H1	1.712	1.513	1.203	1.036	1.244	1.604	1.942	2.208	2.208
7_H2	1.582	1.567	1.439	1.255	1.548	1.734	1.977	2.393	2.393
8_H1	1.543	1.490	1.769	1.811	1.674	1.669	2.187	2.763	2.763
8_H2	2.089	1.557	1.566	1.300	1.619	2.234	3.110	3.793	3.793
9_H1	2.949	3.384	3.110	1.862	2.736	3.096	3.112	3.819	3.819
9_H2	2.847	2.493	1.954	2.247	2.659	2.876	3.298	4.387	4.387
10_H1	2.654	2.890	2.847	3.024	2.726	2.730	3.951	5.443	5.443
10_H2	2.183	1.919	2.089	2.417	2.538	2.922	4.059	5.581	5.581
11_H1	2.341	2.902	2.455	1.763	2.187	2.633	3.093	4.028	4.028
11_H2	2.060	1.853	1.781	1.561	1.918	1.960	2.424	3.200	3.200

Min	1.543	1.490	1.203	1.036	1.244	1.604	1.942	2.208	2.208
Max	3.015	3.384	3.110	3.024	2.736	3.096	4.059	5.581	5.581
Mean	2.219	2.066	1.855	1.664	1.944	2.253	2.765	3.459	3.459
σ	0.466	0.540	0.484	0.441	0.435	0.444	0.610	0.926	0.926
Mean-σ	1.754	1.526	1.371	1.223	1.509	1.809	2.155	2.534	2.534
Mean+σ	2.685	2.606	2.339	2.105	2.379	2.697	3.376	4.385	4.385
Q1	1.887	1.617	1.551	1.356	1.616	1.963	2.359	2.763	2.763
Median	2.184	1.907	1.775	1.581	1.767	2.222	2.593	3.336	3.336
Q3	2.583	2.447	1.978	1.786	2.223	2.595	3.111	3.984	3.984

Table A.138 PFA results (Bldg: U2 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.217	1.939	1.731	1.609	1.601	2.039	2.524	3.095	3.095
1_H2	2.062	1.672	1.553	1.472	1.809	1.972	2.471	3.137	3.137
2_H1	2.398	2.485	2.374	1.730	2.170	2.528	2.675	3.449	3.449
2_H2	2.959	2.338	1.785	1.458	2.054	2.281	3.081	3.775	3.775
3_H1	3.052	2.642	1.937	1.760	2.212	2.774	3.497	4.288	4.288
3_H2	3.176	2.454	2.090	1.653	1.787	2.375	3.462	4.210	4.210
4_H1	2.200	1.918	1.676	1.533	1.783	2.110	2.391	2.921	2.921
4_H2	2.253	1.890	1.427	1.330	1.762	2.264	2.486	2.736	2.736
5_H1	1.590	1.535	1.528	1.314	1.570	1.723	2.019	2.456	2.456
5_H2	1.833	1.581	1.307	1.344	1.532	2.000	2.414	2.696	2.696
6_H1	2.247	1.997	1.816	1.771	2.188	2.289	2.915	3.389	3.389
6_H2	1.860	1.535	1.410	1.461	1.541	1.980	2.556	3.040	3.040
7_H1	1.636	1.721	1.570	1.303	1.653	1.839	2.065	2.456	2.456
7_H2	1.704	1.557	1.234	1.041	1.239	1.565	1.886	2.141	2.141
8_H1	2.107	1.556	1.553	1.305	1.660	2.322	3.231	3.877	3.877
8_H2	1.722	1.493	1.734	1.824	1.614	1.773	2.401	3.001	3.001
9_H1	3.098	2.533	1.979	2.260	2.583	3.135	3.723	4.465	4.465
9_H2	2.965	3.282	3.083	1.943	2.753	3.080	3.296	3.890	3.890
10_H1	2.512	1.987	2.240	2.426	2.615	2.952	4.025	5.357	5.357
10_H2	2.773	2.964	2.796	3.054	2.604	2.728	3.865	5.357	5.357
11_H1	2.104	1.834	1.640	1.535	1.704	1.921	2.403	3.204	3.204
11_H2	2.235	2.492	2.048	1.759	2.141	2.320	2.956	3.942	3.942

Min	1.590	1.493	1.234	1.041	1.239	1.565	1.886	2.141	2.141
Max	3.176	3.282	3.083	3.054	2.753	3.135	4.025	5.357	5.357
Mean	2.305	2.064	1.841	1.677	1.935	2.271	2.834	3.495	3.495
σ	0.504	0.511	0.462	0.444	0.420	0.441	0.614	0.872	0.872
Mean-σ	1.801	1.553	1.380	1.232	1.515	1.830	2.220	2.623	2.623
Mean+σ	2.809	2.575	2.303	2.121	2.355	2.713	3.447	4.367	4.367
Q1	1.911	1.604	1.553	1.373	1.623	1.974	2.406	2.941	2.941
Median	2.226	1.929	1.732	1.572	1.785	2.272	2.616	3.296	3.296
Q3	2.708	2.478	2.030	1.768	2.184	2.489	3.280	3.929	3.929

Table A.139 PFA results (Bldg: U2 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.150	2.483	1.859	1.416	2.164	3.019	3.897	4.810	4.810
1_H2	2.387	2.060	1.884	1.793	2.016	2.480	2.936	3.604	3.604
2_H1	2.341	2.156	1.910	1.916	2.233	2.437	2.622	3.162	3.162
2_H2	2.014	1.876	1.601	1.459	1.678	1.953	2.330	2.721	2.721
3_H1	1.978	1.867	1.783	1.894	1.938	2.112	2.331	2.533	2.533
3_H2	1.552	1.410	1.267	1.181	1.427	1.591	1.780	2.120	2.120
4_H1	3.432	2.813	2.728	2.765	2.886	3.432	4.241	5.461	5.461
4_H2	4.021	3.610	2.998	2.649	2.992	3.779	4.534	6.603	6.603
5_H1	2.411	2.618	2.616	1.719	2.074	2.394	2.873	3.523	3.523
5_H2	2.071	2.168	2.082	1.702	1.918	2.081	2.796	3.835	3.835
6_H1	1.836	1.567	1.297	1.299	1.541	1.784	2.036	2.476	2.476
6_H2	2.179	2.052	1.872	1.830	2.073	2.262	2.389	2.470	2.470
7_H1	1.745	1.626	1.462	1.344	1.620	1.814	2.041	2.510	2.510
7_H2	2.185	2.113	1.963	1.814	2.015	2.150	2.332	2.653	2.653
8_H1	2.322	1.832	1.430	1.253	1.620	2.113	2.647	3.353	3.353
8_H2	1.929	1.573	1.358	1.318	1.555	1.882	2.185	2.431	2.431
9_H1	2.668	2.398	2.241	2.249	2.460	2.884	3.804	5.026	5.026
9_H2	2.558	2.261	2.290	2.579	3.018	3.205	4.557	6.141	6.141
10_H1	2.497	1.927	1.793	1.768	1.918	2.113	2.950	3.735	3.735
10_H2	5.150	4.359	3.598	2.294	2.814	4.561	5.440	6.418	6.418
11_H1	4.179	3.163	2.837	2.739	2.499	2.998	4.152	4.963	4.963
11_H2	2.146	1.911	1.848	2.091	2.229	2.262	2.887	3.736	3.736

Min	1.552	1.410	1.267	1.181	1.427	1.591	1.780	2.120	2.120
Max	5.150	4.359	3.598	2.765	3.018	4.561	5.440	6.603	6.603
Mean	2.580	2.265	2.033	1.867	2.122	2.514	3.080	3.831	3.831
σ	0.891	0.706	0.605	0.500	0.483	0.733	0.999	1.406	1.406
Mean-σ	1.689	1.560	1.428	1.367	1.640	1.781	2.081	2.425	2.425
Mean+σ	3.471	2.971	2.637	2.367	2.605	3.247	4.079	5.237	5.237
Q1	2.028	1.869	1.646	1.426	1.738	2.089	2.331	2.563	2.563
Median	2.331	2.086	1.878	1.804	2.044	2.262	2.835	3.564	3.564
Q3	2.641	2.461	2.278	2.210	2.404	2.969	3.873	4.925	4.925

Table A.140 PFA results (Bldg: U2 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.501	2.136	1.862	1.833	2.082	2.619	3.078	3.662	3.662
1_H2	3.233	2.518	1.843	1.466	2.154	3.008	3.955	4.812	4.812
2_H1	2.099	2.004	1.704	1.435	1.717	2.069	2.551	2.927	2.927
2_H2	2.359	2.178	1.940	1.885	2.234	2.488	2.668	3.164	3.164
3_H1	1.668	1.504	1.301	1.199	1.420	1.595	1.787	2.084	2.084
3_H2	2.013	1.897	1.771	1.904	1.974	2.107	2.333	2.554	2.554
4_H1	4.134	3.619	2.917	2.753	3.174	3.768	4.636	6.000	6.000
4_H2	3.666	2.993	3.367	2.579	3.260	3.485	4.302	5.713	5.713
5_H1	2.106	2.009	1.938	1.644	1.892	2.054	2.722	3.435	3.435
5_H2	2.452	2.366	2.349	1.718	2.065	2.317	3.027	3.494	3.494
6_H1	2.125	2.004	1.833	1.841	2.070	2.249	2.365	2.437	2.437
6_H2	1.779	1.557	1.271	1.270	1.477	1.752	2.013	2.493	2.493
7_H1	2.246	2.082	1.941	1.797	1.977	2.148	2.410	2.692	2.692
7_H2	1.855	1.699	1.427	1.359	1.698	1.937	2.117	2.489	2.489
8_H1	1.913	1.606	1.354	1.291	1.541	1.859	2.128	2.368	2.368
8_H2	2.276	1.817	1.383	1.239	1.643	2.085	2.767	3.315	3.315
9_H1	2.502	2.330	2.410	2.576	3.171	3.194	4.676	6.216	6.216
9_H2	2.693	2.243	2.313	2.304	2.382	2.645	3.746	4.818	4.818
10_H1	5.172	4.277	3.558	2.300	2.911	4.599	5.472	6.367	6.367
10_H2	2.653	1.932	1.929	1.795	2.089	2.350	3.142	3.881	3.881
11_H1	2.060	1.979	1.964	2.101	2.288	2.300	2.901	3.691	3.691
11_H2	4.250	3.234	2.835	2.698	2.505	3.033	4.166	4.843	4.843

Min	1.668	1.504	1.271	1.199	1.420	1.595	1.787	2.084	2.084
Max	5.172	4.277	3.558	2.753	3.260	4.599	5.472	6.367	6.367
Mean	2.625	2.272	2.055	1.863	2.169	2.530	3.135	3.793	3.793
σ	0.912	0.692	0.637	0.495	0.546	0.728	1.009	1.359	1.359
Mean-σ	1.713	1.580	1.417	1.368	1.623	1.802	2.126	2.434	2.434
Mean+σ	3.538	2.964	2.692	2.358	2.715	3.258	4.144	5.153	5.153
Q1	2.070	1.906	1.721	1.442	1.761	2.073	2.377	2.589	2.589
Median	2.317	2.045	1.933	1.815	2.076	2.308	2.834	3.464	3.464
Q3	2.683	2.357	2.340	2.250	2.358	2.917	3.903	4.816	4.816

Table A.141 PFA results (Bldg: U3 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.815	1.631	1.761	1.472	1.613	1.790	2.034	2.575	2.575
1_H2	2.162	1.808	1.985	1.712	1.508	1.698	2.468	3.043	3.043
2_H1	1.234	1.163	1.480	1.351	1.186	1.203	1.547	2.155	2.155
2_H2	1.711	1.856	1.771	1.449	1.562	1.599	1.832	2.379	2.379
3_H1	1.771	1.503	1.367	1.144	1.440	1.781	2.381	2.850	2.850
3_H2	1.605	1.358	1.460	1.367	1.526	1.563	2.041	2.507	2.507
4_H1	1.519	1.215	1.133	0.995	1.304	1.551	1.866	2.292	2.292
4_H2	1.478	1.250	1.042	1.011	1.185	1.456	1.899	2.230	2.230
5_H1	1.583	1.482	1.257	1.052	1.315	1.672	1.719	2.065	2.065
5_H2	0.775	0.919	0.904	0.710	0.810	0.980	1.011	1.224	1.224
6_H1	1.700	1.630	1.690	1.351	1.467	1.673	2.066	2.617	2.617
6_H2	2.511	2.081	2.048	1.825	2.040	2.473	3.448	4.532	4.532
7_H1	2.106	1.963	1.796	1.487	1.476	1.861	2.385	3.248	3.248
7_H2	2.499	2.434	2.112	1.342	1.510	2.014	2.963	3.687	3.687
8_H1	4.148	4.288	4.030	2.036	2.214	3.129	3.926	5.477	5.477
8_H2	3.084	2.823	2.340	1.945	2.461	2.961	3.972	5.316	5.316
9_H1	2.145	1.752	1.254	1.053	1.566	2.152	2.758	3.245	3.245
9_H2	1.453	1.217	1.040	0.901	1.200	1.406	1.736	2.004	2.004
10_H1	1.637	1.370	1.175	1.101	1.242	1.497	1.741	2.105	2.105
10_H2	1.296	1.158	1.024	0.851	0.981	1.218	1.408	1.559	1.559
11_H1	1.639	1.373	1.205	1.180	1.363	1.538	2.036	2.450	2.450
11_H2	1.414	1.140	1.057	1.037	1.241	1.413	1.686	1.996	1.996

Min	0.775	0.919	0.904	0.710	0.810	0.980	1.011	1.224	1.224
Max	4.148	4.288	4.030	2.036	2.461	3.129	3.972	5.477	5.477
Mean	1.877	1.701	1.588	1.290	1.464	1.756	2.224	2.798	2.798
σ	0.711	0.736	0.682	0.356	0.377	0.528	0.772	1.103	1.103
Mean-σ	1.166	0.965	0.905	0.934	1.087	1.228	1.452	1.695	1.695
Mean+σ	2.587	2.436	2.270	1.645	1.841	2.284	2.996	3.901	3.901
Q1	1.488	1.225	1.143	1.041	1.241	1.467	1.737	2.118	2.118
Median	1.670	1.492	1.413	1.261	1.454	1.636	2.035	2.478	2.478
Q3	2.135	1.844	1.790	1.466	1.553	1.843	2.447	3.194	3.194

Table A.142 PFA results (Bldg: U3 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.523	2.184	2.093	1.570	1.434	1.871	2.643	3.220	3.220
1_H2	1.841	1.857	1.720	1.443	1.495	1.775	2.191	2.634	2.634
2_H1	1.859	1.967	1.643	1.362	1.458	1.557	1.854	2.383	2.383
2_H2	1.331	1.211	1.357	1.294	1.194	1.273	1.650	2.155	2.155
3_H1	1.764	1.503	1.472	1.307	1.586	1.696	2.205	2.655	2.655
3_H2	1.711	1.495	1.241	1.042	1.530	1.947	2.414	2.817	2.817
4_H1	1.494	1.247	1.038	0.991	1.203	1.539	1.856	2.078	2.078
4_H2	1.395	1.186	1.091	0.985	1.234	1.439	1.735	2.120	2.120
5_H1	0.784	0.835	0.816	0.694	0.819	0.887	0.921	1.092	1.092
5_H2	1.633	1.379	1.127	1.029	1.312	1.591	1.811	2.140	2.140
6_H1	2.438	2.054	1.769	1.733	1.880	2.206	3.375	4.416	4.416
6_H2	2.156	1.723	1.554	1.352	1.547	1.875	2.516	3.118	3.118
7_H1	2.530	2.450	2.037	1.249	1.630	2.256	3.145	3.898	3.898
7_H2	2.074	2.086	1.886	1.461	1.513	1.875	2.453	3.102	3.102
8_H1	2.898	2.676	2.327	1.947	2.202	2.470	3.860	5.073	5.073
8_H2	4.441	4.383	3.988	2.031	2.401	3.220	4.164	4.900	4.900
9_H1	1.506	1.208	1.022	0.910	1.161	1.492	1.793	2.018	2.018
9_H2	1.882	1.431	1.153	1.027	1.524	1.916	2.414	2.808	2.808
10_H1	1.274	1.101	0.964	0.825	0.993	1.245	1.372	1.520	1.520
10_H2	1.579	1.281	1.156	1.118	1.248	1.472	1.743	2.065	2.065
11_H1	1.442	1.215	1.071	1.024	1.220	1.445	1.673	1.945	1.945
11_H2	1.666	1.345	1.219	1.168	1.282	1.525	1.962	2.338	2.338

Min	0.784	0.835	0.816	0.694	0.819	0.887	0.921	1.092	1.092
Max	4.441	4.383	3.988	2.031	2.401	3.220	4.164	5.073	5.073
Mean	1.919	1.719	1.534	1.253	1.448	1.753	2.261	2.750	2.750
σ	0.745	0.761	0.686	0.345	0.361	0.487	0.793	1.033	1.033
Mean-σ	1.174	0.958	0.848	0.908	1.087	1.266	1.469	1.717	1.717
Mean+σ	2.664	2.480	2.219	1.598	1.809	2.240	3.054	3.783	3.783
Q1	1.497	1.223	1.100	1.024	1.223	1.477	1.756	2.089	2.089
Median	1.737	1.463	1.299	1.208	1.446	1.643	2.076	2.509	2.509
Q3	2.136	2.032	1.756	1.423	1.543	1.906	2.500	3.114	3.114

Table A.143 PFA results (Bldg: U3 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.041	1.743	1.588	1.552	1.783	2.086	2.319	2.999	2.999
1_H2	2.206	1.968	1.620	1.654	1.693	1.998	2.308	2.855	2.855
2_H1	3.130	2.427	1.912	1.416	2.089	2.483	3.170	3.979	3.979
2_H2	2.327	2.394	2.318	1.711	2.522	2.692	2.597	3.483	3.483
3_H1	2.948	2.531	2.243	1.717	1.963	2.450	3.408	4.117	4.117
3_H2	3.136	2.947	2.190	1.831	2.617	3.260	3.408	4.291	4.291
4_H1	2.361	1.989	1.473	1.354	1.791	2.426	2.735	3.030	3.030
4_H2	2.076	1.969	1.784	1.533	1.808	2.036	2.194	2.833	2.833
5_H1	1.964	1.706	1.390	1.367	1.602	2.084	2.484	2.795	2.795
5_H2	1.699	1.534	1.533	1.292	1.553	1.651	1.973	2.397	2.397
6_H1	1.889	1.629	1.540	1.415	1.628	1.984	2.436	3.069	3.069
6_H2	2.264	2.005	1.803	1.744	2.182	2.306	2.923	3.536	3.536
7_H1	1.763	1.504	1.201	1.059	1.254	1.649	2.066	2.399	2.399
7_H2	1.652	1.565	1.476	1.275	1.542	1.713	2.115	2.544	2.544
8_H1	1.607	1.579	1.793	1.846	1.906	1.855	2.230	3.052	3.052
8_H2	2.111	1.612	1.548	1.350	1.725	2.356	3.140	3.850	3.850
9_H1	2.899	3.345	3.140	1.982	2.828	3.073	3.199	4.039	4.039
9_H2	3.071	2.618	2.144	2.260	2.814	3.206	3.619	4.972	4.972
10_H1	3.003	3.228	3.058	3.124	2.905	3.123	4.119	5.967	5.967
10_H2	2.448	2.508	2.379	2.456	3.205	3.688	4.257	6.223	6.223
11_H1	2.453	3.660	3.143	1.835	3.012	2.823	3.142	4.281	4.281
11_H2	2.314	2.196	2.550	1.559	2.678	2.584	2.424	3.361	3.361

Min	1.607	1.504	1.201	1.059	1.254	1.649	1.973	2.397	2.397
Max	3.136	3.660	3.143	3.124	3.205	3.688	4.257	6.223	6.223
Mean	2.335	2.212	1.992	1.697	2.141	2.433	2.830	3.640	3.640
σ	0.501	0.638	0.579	0.458	0.575	0.572	0.657	1.048	1.048
Mean-σ	1.833	1.574	1.413	1.239	1.566	1.861	2.173	2.591	2.591
Mean+σ	2.836	2.850	2.571	2.154	2.715	3.005	3.488	4.688	4.688
Q1	1.983	1.648	1.542	1.379	1.701	2.007	2.310	2.891	2.891
Median	2.289	1.997	1.798	1.606	1.935	2.391	2.666	3.422	3.422
Q3	2.788	2.525	2.299	1.834	2.663	2.790	3.192	4.098	4.098

Table A.144 PFA results (Bldg: U3 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.382	2.036	1.776	1.619	1.711	2.150	2.722	3.279	3.279
1_H2	2.174	1.769	1.550	1.448	1.937	2.044	2.583	3.214	3.214
2_H1	2.458	2.569	2.439	1.756	2.360	2.841	2.774	3.796	3.796
2_H2	2.758	2.152	1.898	1.499	2.268	2.491	2.980	3.818	3.818
3_H1	2.978	2.700	2.122	1.678	2.449	2.993	3.512	4.657	4.657
3_H2	3.026	2.668	2.123	1.591	2.115	2.384	3.476	4.324	4.324
4_H1	2.220	1.960	1.740	1.535	1.873	2.242	2.413	2.898	2.898
4_H2	2.110	1.773	1.416	1.324	1.733	2.151	2.276	2.653	2.653
5_H1	1.715	1.598	1.549	1.322	1.615	1.829	2.170	2.622	2.622
5_H2	1.835	1.593	1.285	1.348	1.565	2.016	2.379	2.619	2.619
6_H1	2.303	2.118	1.821	1.827	2.249	2.446	2.949	3.475	3.475
6_H2	1.858	1.640	1.530	1.409	1.644	2.153	2.520	3.008	3.008
7_H1	1.674	1.712	1.529	1.259	1.637	1.852	1.964	2.373	2.373
7_H2	1.711	1.523	1.221	1.035	1.209	1.521	1.808	2.109	2.109
8_H1	2.163	1.603	1.538	1.284	1.703	2.352	3.242	3.943	3.943
8_H2	1.739	1.573	1.791	1.771	1.759	1.775	2.348	2.815	2.815
9_H1	2.911	2.498	1.912	2.273	2.676	2.977	3.547	4.302	4.302
9_H2	3.102	3.417	3.120	1.880	2.992	3.426	3.435	4.310	4.310
10_H1	2.370	2.594	2.452	2.411	3.060	3.231	3.837	5.116	5.116
10_H2	2.574	2.774	2.628	2.917	2.722	2.926	3.756	5.164	5.164
11_H1	1.977	2.045	2.225	1.540	2.440	2.267	2.428	3.326	3.326
11_H2	2.176	3.465	2.767	1.774	3.031	2.647	2.880	3.750	3.750

Min	1.674	1.523	1.221	1.035	1.209	1.521	1.808	2.109	2.109
Max	3.102	3.465	3.120	2.917	3.060	3.426	3.837	5.164	5.164
Mean	2.283	2.172	1.929	1.659	2.125	2.396	2.818	3.526	3.526
σ	0.454	0.586	0.504	0.426	0.535	0.501	0.590	0.868	0.868
Mean-σ	1.829	1.585	1.425	1.233	1.590	1.896	2.228	2.658	2.658
Mean+σ	2.736	2.758	2.433	2.085	2.660	2.897	3.408	4.394	4.394
Q1	1.888	1.658	1.541	1.363	1.705	2.071	2.388	2.836	2.836
Median	2.198	2.040	1.806	1.565	2.026	2.310	2.748	3.401	3.401
Q3	2.545	2.587	2.199	1.773	2.447	2.792	3.386	4.212	4.212

Table A.145 PFA results (Bldg: U3 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.255	2.645	2.025	1.452	2.281	3.124	3.907	4.774	4.774
1_H2	2.347	2.148	2.078	1.806	2.077	2.536	2.863	3.502	3.502
2_H1	2.313	2.211	2.075	1.953	2.282	2.497	2.654	3.121	3.121
2_H2	1.952	1.826	1.598	1.464	1.611	1.963	2.315	2.745	2.745
3_H1	2.032	1.900	1.809	1.909	1.979	2.144	2.382	2.617	2.617
3_H2	1.530	1.393	1.253	1.220	1.430	1.562	1.711	2.056	2.056
4_H1	3.783	3.985	3.831	2.561	3.572	5.115	4.495	6.894	6.894
4_H2	4.126	3.964	3.926	2.700	4.213	4.416	4.583	7.132	7.132
5_H1	2.373	2.917	2.794	1.768	2.456	2.974	3.099	4.307	4.307
5_H2	2.098	2.987	2.839	1.672	2.450	2.573	2.831	3.997	3.997
6_H1	1.876	1.718	1.385	1.300	1.632	1.870	2.047	2.519	2.519
6_H2	2.245	2.145	1.970	1.863	2.109	2.302	2.442	2.546	2.546
7_H1	1.713	1.628	1.483	1.352	1.636	1.878	2.029	2.465	2.465
7_H2	2.200	2.146	1.993	1.807	2.077	2.237	2.428	2.748	2.748
8_H1	2.467	2.025	1.526	1.268	1.808	2.253	2.944	3.578	3.578
8_H2	2.010	1.668	1.448	1.319	1.596	1.943	2.249	2.480	2.480
9_H1	2.863	2.878	3.175	2.265	3.753	4.127	3.914	6.200	6.200
9_H2	2.904	2.730	2.817	2.539	3.130	3.442	4.844	6.547	6.547
10_H1	2.584	2.054	2.027	1.894	2.161	2.389	3.018	4.257	4.257
10_H2	5.250	4.691	3.873	2.314	2.769	4.649	5.523	6.440	6.440
11_H1	4.213	3.218	3.040	2.739	2.536	3.012	4.046	4.892	4.892
11_H2	2.155	1.873	1.868	2.140	2.243	2.386	2.943	3.963	3.963

Min	1.530	1.393	1.253	1.220	1.430	1.562	1.711	2.056	2.056
Max	5.250	4.691	3.926	2.739	4.213	5.115	5.523	7.132	7.132
Mean	2.649	2.489	2.311	1.878	2.355	2.791	3.149	4.081	4.081
σ	0.936	0.864	0.842	0.482	0.739	0.982	1.036	1.631	1.631
Mean-σ	1.714	1.625	1.469	1.395	1.616	1.808	2.113	2.450	2.450
Mean+σ	3.585	3.353	3.152	2.360	3.093	3.773	4.184	5.712	5.712
Q1	2.048	1.880	1.650	1.455	1.851	2.168	2.393	2.649	2.649
Median	2.330	2.147	2.026	1.835	2.202	2.443	2.903	3.771	3.771
Q3	2.893	2.907	2.834	2.234	2.516	3.096	3.912	4.862	4.862

Table A.146 PFA results (Bldg: U3 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.565	2.287	1.940	1.883	2.181	2.659	3.146	3.681	3.681
1_H2	3.113	2.329	1.818	1.449	2.050	3.022	3.978	4.869	4.869
2_H1	2.212	2.044	1.696	1.444	1.758	2.112	2.613	2.962	2.962
2_H2	2.404	2.186	1.888	1.890	2.238	2.513	2.736	3.216	3.216
3_H1	1.693	1.524	1.315	1.176	1.451	1.655	1.898	2.222	2.222
3_H2	1.978	1.879	1.762	1.895	1.978	2.127	2.292	2.460	2.460
4_H1	4.178	3.870	3.866	2.740	4.093	4.033	5.106	7.752	7.752
4_H2	3.681	4.123	4.087	2.642	4.002	4.499	4.711	7.132	7.132
5_H1	2.096	2.806	2.570	1.656	2.369	2.274	2.761	3.532	3.532
5_H2	2.548	2.539	2.446	1.719	2.260	2.438	2.914	3.890	3.890
6_H1	2.142	1.997	1.820	1.828	2.076	2.271	2.403	2.489	2.489
6_H2	1.782	1.581	1.317	1.259	1.565	1.829	2.018	2.470	2.470
7_H1	2.354	2.221	1.968	1.824	2.031	2.267	2.451	2.777	2.777
7_H2	1.869	1.743	1.467	1.352	1.656	1.899	2.100	2.537	2.537
8_H1	1.895	1.659	1.321	1.305	1.498	1.828	2.133	2.352	2.352
8_H2	2.169	1.686	1.387	1.248	1.684	2.004	2.564	3.186	3.186
9_H1	2.488	2.626	2.739	2.634	3.239	3.105	4.407	5.771	5.771
9_H2	2.664	2.713	2.949	2.286	3.334	3.326	3.845	5.918	5.918
10_H1	5.241	4.243	3.481	2.278	2.911	4.584	5.476	6.572	6.572
10_H2	2.600	2.080	1.994	1.730	2.099	2.317	3.072	4.106	4.106
11_H1	2.203	2.005	1.961	2.091	2.327	2.288	2.880	3.582	3.582
11_H2	4.187	3.143	2.764	2.671	2.477	3.166	4.309	4.974	4.974

Min	1.693	1.524	1.315	1.176	1.451	1.655	1.898	2.222	2.222
Max	5.241	4.243	4.087	2.740	4.093	4.584	5.476	7.752	7.752
Mean	2.639	2.422	2.207	1.864	2.331	2.646	3.173	4.021	4.021
σ	0.909	0.794	0.815	0.500	0.749	0.838	1.060	1.668	1.668
Mean-σ	1.730	1.628	1.393	1.364	1.581	1.808	2.113	2.353	2.353
Mean+σ	3.549	3.216	3.022	2.363	3.080	3.485	4.234	5.688	5.688
Q1	2.107	1.908	1.713	1.445	1.813	2.116	2.415	2.597	2.597
Median	2.379	2.204	1.950	1.826	2.140	2.302	2.821	3.557	3.557
Q3	2.648	2.691	2.697	2.231	2.450	3.084	3.944	4.948	4.948

Table A.147 PFA results (Bldg: U4 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.827	1.549	1.570	1.491	1.520	1.692	2.083	2.542	2.542
1_H2	2.033	1.727	1.929	1.815	1.461	1.669	2.369	2.938	2.938
2_H1	1.272	1.139	1.381	1.355	1.200	1.238	1.582	2.183	2.183
2_H2	1.658	1.812	1.734	1.516	1.495	1.583	1.833	2.317	2.317
3_H1	1.826	1.484	1.409	1.114	1.410	1.833	2.419	2.907	2.907
3_H2	1.579	1.357	1.448	1.360	1.486	1.615	2.046	2.524	2.524
4_H1	1.590	1.239	1.139	0.995	1.326	1.592	1.926	2.339	2.339
4_H2	1.567	1.284	1.072	1.019	1.181	1.500	1.936	2.251	2.251
5_H1	1.562	1.362	1.166	1.045	1.195	1.470	1.709	2.002	2.002
5_H2	0.857	0.894	0.856	0.756	0.753	0.874	1.013	1.130	1.130
6_H1	1.785	1.490	1.508	1.375	1.468	1.657	2.138	2.544	2.544
6_H2	2.563	2.047	1.956	1.822	2.089	2.485	3.444	4.555	4.555
7_H1	2.160	1.968	1.808	1.498	1.445	1.869	2.436	3.230	3.230
7_H2	2.578	2.432	2.132	1.393	1.580	2.046	3.024	3.795	3.795
8_H1	4.147	3.585	3.405	2.054	2.042	2.826	3.736	4.853	4.853
8_H2	3.064	2.502	2.075	1.943	2.446	2.855	4.026	5.291	5.291
9_H1	2.228	1.867	1.355	1.119	1.701	2.286	2.853	3.329	3.329
9_H2	1.501	1.213	1.029	0.947	1.262	1.512	1.812	2.114	2.114
10_H1	1.643	1.391	1.182	1.118	1.228	1.502	1.719	2.081	2.081
10_H2	1.309	1.181	1.025	0.896	1.047	1.185	1.440	1.626	1.626
11_H1	1.674	1.403	1.223	1.236	1.392	1.556	2.045	2.447	2.447
11_H2	1.485	1.150	1.058	1.048	1.253	1.463	1.716	2.030	2.030

Min	0.857	0.894	0.856	0.756	0.753	0.874	1.013	1.130	1.130
Max	4.147	3.585	3.405	2.054	2.446	2.855	4.026	5.291	5.291
Mean	1.905	1.640	1.521	1.314	1.454	1.741	2.241	2.774	2.774
σ	0.700	0.600	0.561	0.355	0.367	0.494	0.756	1.042	1.042
Mean-σ	1.205	1.039	0.960	0.959	1.087	1.247	1.485	1.732	1.732
Mean+σ	2.605	2.240	2.082	1.669	1.821	2.236	2.997	3.816	3.816
Q1	1.563	1.250	1.145	1.045	1.234	1.501	1.742	2.131	2.131
Median	1.666	1.443	1.395	1.295	1.427	1.603	2.046	2.485	2.485
Q3	2.128	1.853	1.790	1.496	1.514	1.860	2.431	3.157	3.157

Table A.148 PFA results (Bldg: U4 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.639	2.197	2.091	1.512	1.411	1.903	2.764	3.357	3.357
1_H2	1.839	1.809	1.680	1.401	1.429	1.814	2.267	2.711	2.711
2_H1	1.924	2.014	1.625	1.334	1.452	1.532	1.857	2.399	2.399
2_H2	1.372	1.207	1.312	1.274	1.172	1.241	1.629	2.088	2.088
3_H1	1.763	1.518	1.458	1.304	1.609	1.730	2.198	2.643	2.643
3_H2	1.726	1.458	1.221	1.095	1.593	1.979	2.404	2.802	2.802
4_H1	1.440	1.201	1.041	0.989	1.222	1.512	1.801	2.038	2.038
4_H2	1.378	1.180	1.085	0.983	1.206	1.413	1.707	2.091	2.091
5_H1	0.804	0.786	0.784	0.690	0.801	0.854	0.910	1.056	1.056
5_H2	1.646	1.365	1.134	1.032	1.274	1.528	1.826	2.151	2.151
6_H1	2.353	2.063	1.691	1.714	1.862	2.122	3.260	4.246	4.246
6_H2	2.143	1.691	1.532	1.381	1.517	1.935	2.552	3.251	3.251
7_H1	2.572	2.460	2.024	1.231	1.713	2.324	3.197	3.943	3.943
7_H2	2.036	2.029	1.853	1.455	1.522	1.843	2.451	3.122	3.122
8_H1	2.865	2.554	2.169	1.921	2.133	2.437	3.811	5.016	5.016
8_H2	4.372	4.215	3.869	2.065	2.285	3.080	4.215	5.098	5.098
9_H1	1.377	1.158	1.010	0.955	1.155	1.416	1.650	1.864	1.864
9_H2	1.762	1.453	1.206	1.049	1.573	1.904	2.238	2.607	2.607
10_H1	1.287	1.123	0.938	0.833	0.993	1.247	1.380	1.512	1.512
10_H2	1.577	1.274	1.162	1.133	1.257	1.452	1.741	2.062	2.062
11_H1	1.456	1.213	1.054	1.016	1.216	1.439	1.682	1.957	1.957
11_H2	1.660	1.346	1.227	1.171	1.283	1.519	1.952	2.317	2.317

Min	0.804	0.786	0.784	0.690	0.801	0.854	0.910	1.056	1.056
Max	4.372	4.215	3.869	2.065	2.285	3.080	4.215	5.098	5.098
Mean	1.909	1.696	1.508	1.252	1.440	1.737	2.250	2.742	2.742
σ	0.738	0.732	0.657	0.337	0.347	0.477	0.800	1.057	1.057
Mean-σ	1.171	0.964	0.851	0.914	1.093	1.260	1.450	1.686	1.686
Mean+σ	2.646	2.428	2.165	1.589	1.787	2.215	3.050	3.799	3.799
Q1	1.444	1.208	1.097	1.020	1.217	1.443	1.716	2.068	2.068
Median	1.744	1.455	1.270	1.201	1.420	1.631	2.075	2.503	2.503
Q3	2.117	2.025	1.688	1.396	1.588	1.928	2.527	3.219	3.219

Table A.149 PFA results (Bldg: U4 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.073	1.750	1.574	1.601	1.692	1.992	2.309	2.980	2.980
1_H2	2.202	1.940	1.549	1.622	1.574	1.963	2.241	2.881	2.881
2_H1	3.273	2.432	1.706	1.399	2.057	2.250	3.288	4.115	4.115
2_H2	2.330	2.394	2.335	1.743	2.136	2.440	2.576	3.476	3.476
3_H1	3.110	2.605	2.179	1.811	1.945	2.368	3.388	4.058	4.058
3_H2	3.299	2.914	2.195	1.915	2.383	3.078	3.522	4.319	4.319
4_H1	2.531	2.108	1.515	1.369	1.771	2.489	2.971	3.263	3.263
4_H2	2.090	1.915	1.712	1.543	1.701	1.968	2.215	2.842	2.842
5_H1	2.070	1.769	1.403	1.399	1.572	2.067	2.448	2.724	2.724
5_H2	1.697	1.425	1.452	1.279	1.484	1.571	1.951	2.352	2.352
6_H1	2.024	1.614	1.371	1.484	1.641	1.993	2.604	3.250	3.250
6_H2	2.446	2.000	1.826	1.736	2.123	2.418	2.937	3.475	3.475
7_H1	1.806	1.468	1.218	1.066	1.266	1.652	2.082	2.443	2.443
7_H2	1.707	1.516	1.494	1.316	1.548	1.704	2.185	2.619	2.619
8_H1	1.592	1.536	1.760	1.913	1.870	1.719	2.277	3.010	3.010
8_H2	2.207	1.715	1.593	1.387	1.670	2.321	3.220	3.889	3.889
9_H1	2.950	3.304	3.152	2.119	2.720	2.990	3.196	4.032	4.032
9_H2	3.313	2.646	2.275	2.269	2.802	3.247	3.960	4.987	4.987
10_H1	3.309	2.915	2.794	3.187	2.812	2.726	4.273	5.958	5.958
10_H2	2.579	2.390	2.059	2.522	2.758	3.090	4.418	5.890	5.890
11_H1	2.523	2.458	2.188	1.875	2.098	2.401	3.207	4.258	4.258
11_H2	2.498	2.058	1.674	1.519	1.636	2.055	2.561	3.159	3.159

Min	1.592	1.425	1.218	1.066	1.266	1.571	1.951	2.352	2.352
Max	3.313	3.304	3.152	3.187	2.812	3.247	4.418	5.958	5.958
Mean	2.438	2.131	1.865	1.731	1.966	2.296	2.901	3.635	3.635
σ	0.560	0.531	0.484	0.475	0.466	0.490	0.711	1.007	1.007
Mean-σ	1.877	1.600	1.381	1.256	1.500	1.806	2.190	2.628	2.628
Mean+σ	2.998	2.662	2.349	2.206	2.432	2.785	3.612	4.643	4.643
Q1	2.071	1.724	1.524	1.399	1.637	1.974	2.285	2.906	2.906
Median	2.388	2.029	1.709	1.612	1.820	2.285	2.771	3.369	3.369
Q3	2.858	2.451	2.185	1.903	2.133	2.477	3.271	4.101	4.101

Table A.150 PFA results (Bldg: U4 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.446	2.077	1.760	1.613	1.677	2.141	2.803	3.385	3.385
1_H2	2.236	1.794	1.597	1.508	1.939	2.084	2.641	3.255	3.255
2_H1	2.449	2.576	2.490	1.806	2.371	2.761	2.775	3.960	3.960
2_H2	2.787	2.087	1.906	1.545	2.170	2.381	2.982	3.834	3.834
3_H1	2.923	2.562	1.998	1.751	2.312	2.834	3.622	4.742	4.742
3_H2	2.841	2.421	2.105	1.584	2.083	2.360	3.478	4.314	4.314
4_H1	2.204	1.932	1.709	1.550	1.859	2.209	2.424	2.912	2.912
4_H2	1.978	1.679	1.413	1.327	1.689	2.098	2.326	2.644	2.644
5_H1	1.757	1.615	1.522	1.297	1.640	1.880	2.260	2.719	2.719
5_H2	1.830	1.582	1.280	1.329	1.599	1.988	2.294	2.517	2.517
6_H1	2.320	2.051	1.823	1.848	2.251	2.456	2.878	3.438	3.438
6_H2	1.894	1.660	1.506	1.372	1.655	2.200	2.547	2.903	2.903
7_H1	1.678	1.667	1.480	1.222	1.590	1.813	2.098	2.470	2.470
7_H2	1.795	1.451	1.204	1.050	1.189	1.468	1.857	2.128	2.128
8_H1	2.158	1.622	1.519	1.343	1.694	2.368	3.186	3.858	3.858
8_H2	1.730	1.501	1.746	1.759	1.748	1.748	2.318	2.794	2.794
9_H1	2.836	2.429	1.859	2.301	2.604	2.875	3.372	4.257	4.257
9_H2	3.183	3.480	3.157	1.867	3.024	3.472	3.487	4.333	4.333
10_H1	2.238	2.364	2.323	2.392	2.883	3.038	3.839	5.083	5.083
10_H2	2.459	2.797	2.570	2.901	2.643	2.920	3.774	5.101	5.101
11_H1	1.878	1.813	1.838	1.555	2.059	2.086	2.439	3.465	3.465
11_H2	2.191	3.121	2.421	1.759	2.798	2.516	2.823	3.723	3.723

Min	1.678	1.451	1.204	1.050	1.189	1.468	1.857	2.128	2.128
Max	3.183	3.480	3.157	2.901	3.024	3.472	3.839	5.101	5.101
Mean	2.264	2.104	1.874	1.667	2.067	2.350	2.828	3.538	3.538
σ	0.437	0.553	0.477	0.424	0.493	0.480	0.572	0.860	0.860
Mean-σ	1.827	1.550	1.397	1.243	1.574	1.869	2.256	2.678	2.678
Mean+σ	2.701	2.657	2.351	2.092	2.560	2.830	3.401	4.398	4.398
Q1	1.882	1.662	1.520	1.350	1.680	2.084	2.351	2.821	2.821
Median	2.220	1.992	1.791	1.570	1.999	2.284	2.789	3.451	3.451
Q3	2.457	2.427	2.078	1.794	2.356	2.699	3.325	4.183	4.183

Table A.151 PFA results (Bldg: U4 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.288	2.571	1.967	1.493	2.292	3.067	3.937	4.819	4.819
1_H2	2.427	2.043	1.881	1.806	1.987	2.429	2.825	3.463	3.463
2_H1	2.366	2.272	2.082	1.990	2.352	2.555	2.706	3.274	3.274
2_H2	1.908	1.804	1.599	1.432	1.629	1.992	2.293	2.761	2.761
3_H1	2.058	1.916	1.813	1.912	1.967	2.147	2.419	2.636	2.636
3_H2	1.717	1.441	1.267	1.211	1.387	1.502	1.825	2.061	2.061
4_H1	3.787	2.787	2.913	2.561	2.591	3.447	4.365	5.544	5.544
4_H2	4.289	3.602	3.257	2.824	3.051	3.482	4.326	5.894	5.894
5_H1	2.321	2.449	2.433	1.841	2.037	2.315	3.207	3.926	3.926
5_H2	2.100	2.041	1.977	1.656	1.964	1.981	2.817	3.657	3.657
6_H1	1.891	1.660	1.386	1.375	1.660	1.846	2.071	2.472	2.472
6_H2	2.306	2.195	2.001	1.901	2.126	2.322	2.496	2.634	2.634
7_H1	1.717	1.627	1.480	1.367	1.656	1.881	2.087	2.437	2.437
7_H2	2.238	2.153	2.009	1.794	2.026	2.277	2.493	2.665	2.665
8_H1	2.762	2.143	1.545	1.245	1.767	2.364	3.279	3.956	3.956
8_H2	2.069	1.693	1.433	1.327	1.619	1.999	2.318	2.556	2.556
9_H1	2.980	2.503	2.222	2.314	2.541	3.084	4.025	5.225	5.225
9_H2	3.308	2.421	2.448	2.546	2.971	3.403	5.008	6.728	6.728
10_H1	2.631	2.065	1.860	1.971	2.161	2.253	3.089	4.157	4.157
10_H2	5.228	4.732	3.902	2.266	2.690	4.520	5.572	6.406	6.406
11_H1	4.031	3.304	3.082	2.786	2.608	3.011	3.838	4.689	4.689
11_H2	2.132	1.845	1.892	2.234	2.393	2.491	3.038	4.159	4.159

Min	1.717	1.441	1.267	1.211	1.387	1.502	1.825	2.061	2.061
Max	5.228	4.732	3.902	2.824	3.051	4.520	5.572	6.728	6.728
Mean	2.707	2.330	2.111	1.902	2.158	2.562	3.183	3.914	3.914
σ	0.928	0.750	0.667	0.497	0.455	0.708	1.008	1.386	1.386
Mean-σ	1.779	1.581	1.445	1.406	1.703	1.855	2.176	2.528	2.528
Mean+σ	3.635	3.080	2.778	2.399	2.613	3.270	4.191	5.300	5.300
Q1	2.077	1.863	1.653	1.447	1.816	2.036	2.437	2.644	2.644
Median	2.343	2.148	1.972	1.871	2.082	2.343	2.931	3.791	3.791
Q3	3.211	2.490	2.380	2.258	2.504	3.053	3.912	4.787	4.787

Table A.152 PFA results (Bldg: U4 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.569	2.251	1.924	1.866	2.150	2.675	3.199	3.820	3.820
1_H2	3.028	2.275	1.695	1.421	2.029	2.990	3.976	4.877	4.877
2_H1	2.251	2.030	1.656	1.445	1.771	2.123	2.638	2.982	2.982
2_H2	2.403	2.158	1.858	1.880	2.227	2.522	2.761	3.225	3.225
3_H1	1.682	1.529	1.339	1.190	1.441	1.654	1.948	2.283	2.283
3_H2	1.952	1.880	1.768	1.887	1.974	2.105	2.288	2.454	2.454
4_H1	4.069	3.597	3.451	2.716	3.797	3.524	5.193	7.956	7.956
4_H2	3.583	3.822	3.649	2.633	3.679	4.098	4.699	7.207	7.207
5_H1	2.068	2.505	2.328	1.671	2.243	2.148	2.758	3.583	3.583
5_H2	2.574	2.384	2.358	1.729	2.131	2.395	2.978	3.687	3.687
6_H1	2.148	1.974	1.803	1.822	2.066	2.265	2.410	2.512	2.512
6_H2	1.777	1.516	1.281	1.251	1.567	1.811	2.004	2.442	2.442
7_H1	2.395	2.223	1.975	1.836	2.064	2.328	2.521	2.774	2.774
7_H2	1.842	1.697	1.465	1.348	1.643	1.872	2.115	2.569	2.569
8_H1	1.873	1.613	1.320	1.322	1.497	1.809	2.116	2.336	2.336
8_H2	2.097	1.631	1.365	1.247	1.594	1.886	2.447	3.105	3.105
9_H1	2.464	2.401	2.308	2.654	3.273	3.136	4.229	5.591	5.591
9_H2	2.595	2.260	2.426	2.280	2.939	3.089	3.711	5.969	5.969
10_H1	5.224	4.114	3.385	2.277	2.884	4.505	5.483	6.641	6.641
10_H2	2.561	2.107	1.946	1.768	1.971	2.373	3.022	3.971	3.971
11_H1	2.282	2.035	1.946	2.103	2.308	2.296	2.891	3.544	3.544
11_H2	4.033	3.051	2.740	2.692	2.539	3.210	4.354	5.030	5.030

Min	1.682	1.516	1.281	1.190	1.441	1.654	1.948	2.283	2.283
Max	5.224	4.114	3.649	2.716	3.797	4.505	5.483	7.956	7.956
Mean	2.612	2.321	2.090	1.865	2.263	2.582	3.170	4.025	4.025
σ	0.883	0.720	0.692	0.499	0.671	0.756	1.055	1.696	1.696
Mean-σ	1.730	1.601	1.398	1.366	1.592	1.826	2.115	2.330	2.330
Mean+σ	3.495	3.041	2.782	2.365	2.934	3.339	4.225	5.721	5.721
Q1	2.075	1.903	1.666	1.427	1.821	2.109	2.419	2.620	2.620
Median	2.399	2.191	1.935	1.829	2.098	2.350	2.826	3.564	3.564
Q3	2.590	2.397	2.350	2.234	2.482	3.064	3.910	4.992	4.992

Table A.153 PFA results (Bldg: Symmetric Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.823	1.672	1.629	1.448	1.668	1.858	2.393	2.995	2.995
1_H2	2.657	2.226	2.076	1.760	1.542	2.163	2.895	3.320	3.320
2_H1	1.325	1.285	1.486	1.434	1.196	1.157	1.673	2.220	2.220
2_H2	2.265	2.383	2.230	1.632	1.429	1.576	1.991	2.648	2.648
3_H1	1.620	1.487	1.311	1.331	1.731	2.025	2.348	2.689	2.689
3_H2	1.826	1.511	1.517	1.425	1.565	1.864	2.347	2.682	2.682
4_H1	1.453	1.308	1.194	1.154	1.498	1.694	1.902	2.270	2.270
4_H2	1.326	1.139	1.095	1.117	1.301	1.498	1.792	2.142	2.142
5_H1	1.581	1.310	1.195	1.100	1.316	1.550	1.841	2.103	2.103
5_H2	0.931	0.907	0.834	0.678	0.704	0.778	0.851	0.990	0.990
6_H1	2.040	1.831	1.743	1.429	1.513	1.853	2.311	2.917	2.917
6_H2	2.364	1.972	1.943	2.036	2.028	2.357	3.499	4.512	4.512
7_H1	2.216	1.972	1.940	1.684	1.496	1.714	2.496	3.281	3.281
7_H2	2.917	2.860	2.337	1.439	1.847	2.378	3.222	4.007	4.007
8_H1	4.607	3.871	3.547	2.193	2.192	2.776	4.413	5.838	5.838
8_H2	3.258	2.489	2.364	2.007	2.482	2.931	4.263	5.710	5.710
9_H1	1.964	1.480	1.160	1.199	1.570	2.145	2.643	3.005	3.005
9_H2	1.584	1.279	1.048	1.093	1.240	1.501	1.799	2.005	2.005
10_H1	1.564	1.306	1.229	1.104	1.331	1.484	1.733	2.050	2.050
10_H2	1.237	1.066	0.989	0.946	1.003	1.236	1.400	1.492	1.492
11_H1	1.610	1.348	1.289	1.248	1.424	1.666	2.077	2.424	2.424
11_H2	1.466	1.290	1.114	1.176	1.353	1.498	1.693	1.973	1.973

Min	0.931	0.907	0.834	0.678	0.704	0.778	0.851	0.990	0.990
Max	4.607	3.871	3.547	2.193	2.482	2.931	4.413	5.838	5.838
Mean	1.983	1.727	1.603	1.392	1.520	1.805	2.345	2.876	2.876
σ	0.817	0.695	0.633	0.373	0.384	0.511	0.876	1.218	1.218
Mean-σ	1.166	1.032	0.970	1.019	1.135	1.293	1.469	1.658	1.658
Mean+σ	2.800	2.422	2.236	1.766	1.904	2.316	3.220	4.094	4.094
Q1	1.491	1.294	1.168	1.126	1.320	1.499	1.794	2.113	2.113
Median	1.722	1.483	1.399	1.378	1.497	1.704	2.194	2.665	2.665
Q3	2.253	1.972	1.942	1.586	1.644	2.115	2.606	3.212	3.212

Table A.154 PFA results (Bldg: Symmetric Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.619	2.172	2.010	1.819	1.512	1.910	2.839	3.664	3.664
1_H2	1.859	1.768	1.587	1.431	1.578	2.052	2.459	2.902	2.902
2_H1	2.229	2.281	2.087	1.637	1.564	1.587	1.992	2.491	2.491
2_H2	1.347	1.176	1.390	1.433	1.304	1.252	1.730	2.277	2.277
3_H1	1.827	1.508	1.537	1.426	1.598	1.824	2.352	2.718	2.718
3_H2	1.611	1.471	1.299	1.332	1.756	2.045	2.344	2.709	2.709
4_H1	1.320	1.156	1.112	1.115	1.320	1.504	1.787	2.152	2.152
4_H2	1.459	1.288	1.182	1.157	1.484	1.671	1.906	2.259	2.259
5_H1	0.916	0.814	0.731	0.678	0.721	0.776	0.848	0.942	0.942
5_H2	1.576	1.392	1.225	1.108	1.389	1.648	1.834	2.118	2.118
6_H1	2.380	2.148	1.961	2.027	2.293	2.354	3.533	4.740	4.740
6_H2	2.048	1.691	1.753	1.435	1.421	1.664	2.348	2.926	2.926
7_H1	2.894	2.757	2.285	1.428	1.779	2.243	3.264	3.963	3.963
7_H2	2.247	2.094	2.015	1.670	1.604	1.814	2.537	3.145	3.145
8_H1	3.281	2.473	2.413	2.083	2.222	2.898	4.275	5.254	5.254
8_H2	4.690	4.264	3.911	2.193	2.642	3.310	4.438	5.408	5.408
9_H1	1.587	1.271	1.032	1.094	1.220	1.522	1.798	1.989	1.989
9_H2	1.963	1.479	1.170	1.199	1.567	2.128	2.641	3.026	3.026
10_H1	1.238	1.047	0.970	0.944	1.009	1.251	1.408	1.497	1.497
10_H2	1.566	1.292	1.215	1.104	1.307	1.460	1.736	2.036	2.036
11_H1	1.472	1.284	1.102	1.179	1.343	1.496	1.701	1.963	1.963
11_H2	1.615	1.335	1.276	1.245	1.419	1.670	2.081	2.415	2.415

Min	0.916	0.814	0.731	0.678	0.721	0.776	0.848	0.942	0.942
Max	4.690	4.264	3.911	2.193	2.642	3.310	4.438	5.408	5.408
Mean	1.988	1.735	1.603	1.397	1.548	1.822	2.357	2.845	2.845
σ	0.829	0.757	0.692	0.381	0.418	0.551	0.880	1.147	1.147
Mean-σ	1.160	0.978	0.911	1.016	1.130	1.271	1.476	1.698	1.698
Mean+σ	2.817	2.491	2.295	1.778	1.966	2.372	3.237	3.992	3.992
Q1	1.496	1.285	1.173	1.126	1.326	1.509	1.790	2.126	2.126
Median	1.721	1.475	1.344	1.379	1.498	1.671	2.213	2.600	2.600
Q3	2.243	2.135	1.997	1.587	1.603	2.050	2.615	3.115	3.115

Table A.155 PFA results (Bldg: Symmetric Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.108	1.891	1.799	1.634	1.883	2.041	2.519	3.136	3.136
1_H2	2.238	1.971	1.875	1.825	1.911	2.106	2.604	3.210	3.210
2_H1	2.806	2.521	2.160	1.673	2.027	2.516	2.890	3.791	3.791
2_H2	2.633	2.758	2.686	2.014	2.253	2.587	2.853	3.860	3.860
3_H1	2.769	2.700	2.317	2.044	1.964	2.334	3.448	4.292	4.292
3_H2	3.174	3.011	2.229	2.080	2.473	3.039	3.604	4.595	4.595
4_H1	2.122	1.880	1.394	1.434	1.695	2.215	2.515	2.778	2.778
4_H2	2.405	1.958	1.732	1.738	1.850	2.063	2.715	3.323	3.323
5_H1	1.924	1.620	1.421	1.358	1.522	1.926	2.316	2.609	2.609
5_H2	1.715	1.602	1.547	1.294	1.560	1.742	2.098	2.548	2.548
6_H1	1.798	1.595	1.534	1.700	1.822	1.996	2.433	2.875	2.875
6_H2	2.256	2.125	1.972	2.058	2.175	2.282	2.627	3.185	3.185
7_H1	1.650	1.446	1.198	1.077	1.325	1.598	1.809	2.001	2.001
7_H2	1.548	1.591	1.412	1.322	1.578	1.784	1.987	2.352	2.352
8_H1	1.805	1.584	1.916	2.009	1.788	2.090	2.599	3.263	3.263
8_H2	2.040	1.595	1.673	1.531	1.910	2.551	3.229	3.738	3.738
9_H1	3.509	3.883	3.435	2.297	3.342	3.680	3.563	4.336	4.336
9_H2	3.229	3.359	2.863	2.521	3.080	3.077	3.685	4.726	4.726
10_H1	3.206	3.047	2.992	3.223	2.912	3.309	3.886	5.587	5.587
10_H2	2.844	2.388	2.440	2.998	3.166	3.399	4.738	6.360	6.360
11_H1	2.543	2.860	2.431	2.180	2.946	3.046	3.458	4.873	4.873
11_H2	1.939	2.686	2.785	1.711	2.578	2.292	2.541	3.785	3.785

Min	1.548	1.446	1.198	1.077	1.325	1.598	1.809	2.001	2.001
Max	3.509	3.883	3.435	3.223	3.342	3.680	4.738	6.360	6.360
Mean	2.376	2.276	2.082	1.896	2.171	2.440	2.914	3.692	3.692
σ	0.576	0.685	0.603	0.532	0.591	0.582	0.709	1.082	1.082
Mean-σ	1.799	1.591	1.479	1.365	1.580	1.858	2.205	2.610	2.610
Mean+σ	2.952	2.961	2.686	2.428	2.762	3.022	3.623	4.774	4.774
Q1	1.928	1.607	1.579	1.557	1.796	2.046	2.516	2.941	2.941
Median	2.247	2.048	1.944	1.781	1.938	2.287	2.671	3.531	3.531
Q3	2.797	2.744	2.438	2.074	2.552	2.926	3.456	4.325	4.325

Table A.156 PFA results (Bldg: Symmetric Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.227	1.909	1.918	1.820	1.951	2.037	2.587	3.121	3.121
1_H2	2.112	1.879	1.769	1.638	1.828	2.044	2.507	3.018	3.018
2_H1	2.633	2.748	2.690	2.030	2.173	2.501	2.842	3.767	3.767
2_H2	2.715	2.143	2.152	1.667	2.328	2.255	2.914	3.756	3.756
3_H1	3.050	2.780	2.366	2.094	2.253	2.824	3.547	4.463	4.463
3_H2	2.807	2.511	2.420	1.943	2.048	2.394	3.436	4.296	4.296
4_H1	2.400	2.035	1.754	1.750	1.951	2.132	2.720	3.404	3.404
4_H2	2.099	1.810	1.437	1.417	1.737	2.238	2.498	2.652	2.652
5_H1	1.702	1.595	1.575	1.307	1.619	1.764	2.103	2.606	2.606
5_H2	1.926	1.664	1.465	1.357	1.545	1.970	2.329	2.618	2.618
6_H1	2.249	2.065	1.929	2.053	2.350	2.413	2.626	3.231	3.231
6_H2	1.801	1.845	1.802	1.689	1.748	1.906	2.421	3.073	3.073
7_H1	1.551	1.582	1.403	1.310	1.560	1.763	1.997	2.354	2.354
7_H2	1.643	1.422	1.241	1.078	1.308	1.528	1.792	2.011	2.011
8_H1	2.033	1.681	1.556	1.536	1.980	2.674	3.205	3.652	3.652
8_H2	1.801	1.697	2.042	1.993	1.806	1.857	2.623	3.225	3.225
9_H1	3.237	3.150	2.682	2.588	3.119	3.058	3.801	4.487	4.487
9_H2	3.558	3.922	3.274	2.325	3.359	3.651	3.623	4.236	4.236
10_H1	2.826	2.539	2.698	2.863	2.957	3.410	4.794	5.758	5.758
10_H2	3.140	2.967	2.790	3.315	3.144	3.137	3.950	6.036	6.036
11_H1	1.991	2.477	2.312	1.732	2.432	2.265	2.553	3.392	3.392
11_H2	2.294	3.096	3.135	1.831	3.369	3.442	3.094	5.638	5.638

Min	1.551	1.422	1.241	1.078	1.308	1.528	1.792	2.011	2.011
Max	3.558	3.922	3.274	3.315	3.369	3.651	4.794	6.036	6.036
Mean	2.354	2.251	2.110	1.879	2.208	2.421	2.907	3.673	3.673
σ	0.566	0.648	0.586	0.531	0.617	0.601	0.718	1.096	1.096
Mean-σ	1.788	1.603	1.524	1.348	1.591	1.820	2.190	2.576	2.576
Mean+σ	2.920	2.898	2.695	2.410	2.824	3.022	3.625	4.769	4.769
Q1	1.942	1.726	1.620	1.561	1.763	1.987	2.500	3.032	3.032
Median	2.238	2.050	1.985	1.785	2.014	2.260	2.673	3.398	3.398
Q3	2.784	2.696	2.617	2.048	2.411	2.787	3.379	4.281	4.281

Table A.157 PFA results (Bldg: Symmetric Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.266	2.548	1.869	1.645	2.212	3.005	4.110	5.081	5.081
1_H2	2.786	2.352	2.108	1.832	2.259	2.829	3.352	3.807	3.807
2_H1	2.618	2.378	2.146	1.949	2.263	2.583	2.912	3.561	3.561
2_H2	2.189	2.171	1.845	1.627	1.880	2.130	2.545	3.052	3.052
3_H1	2.121	2.049	1.929	1.881	2.044	2.032	2.305	2.650	2.650
3_H2	1.850	1.615	1.382	1.303	1.529	1.668	2.019	2.435	2.435
4_H1	3.983	3.960	3.818	2.986	3.114	3.566	4.512	5.766	5.766
4_H2	4.284	3.906	3.378	2.757	3.659	4.462	4.764	7.554	7.554
5_H1	2.776	3.136	2.851	1.862	2.432	2.674	3.239	4.210	4.210
5_H2	2.335	3.025	2.721	1.974	2.751	3.007	2.845	4.189	4.189
6_H1	1.858	1.448	1.328	1.282	1.495	1.668	2.068	2.434	2.434
6_H2	1.963	1.923	1.939	1.844	1.912	1.912	2.066	2.346	2.346
7_H1	1.809	1.577	1.302	1.336	1.567	1.784	2.132	2.584	2.584
7_H2	2.284	2.026	1.783	1.819	1.945	2.187	2.416	2.999	2.999
8_H1	2.372	1.869	1.434	1.340	1.696	2.149	2.813	3.473	3.473
8_H2	1.921	1.597	1.388	1.336	1.445	1.899	2.220	2.402	2.402
9_H1	2.669	2.629	2.578	2.578	2.959	3.371	3.939	5.445	5.445
9_H2	3.396	2.620	2.483	2.734	3.407	3.838	4.521	5.830	5.830
10_H1	2.569	2.482	2.324	2.226	2.493	2.373	3.157	4.239	4.239
10_H2	5.748	4.714	3.477	2.240	2.973	4.592	6.023	6.953	6.953
11_H1	4.469	3.854	2.956	2.729	2.705	3.433	4.296	4.769	4.769
11_H2	2.275	2.245	2.431	2.468	2.704	2.595	3.212	4.294	4.294

Min	1.809	1.448	1.302	1.282	1.445	1.668	2.019	2.346	2.346
Max	5.748	4.714	3.818	2.986	3.659	4.592	6.023	7.554	7.554
Mean	2.797	2.551	2.249	1.988	2.338	2.716	3.248	4.094	4.094
σ	1.018	0.884	0.730	0.534	0.639	0.862	1.085	1.514	1.514
Mean-σ	1.779	1.667	1.519	1.455	1.699	1.854	2.164	2.580	2.580
Mean+σ	3.816	3.436	2.978	2.522	2.977	3.578	4.333	5.608	5.608
Q1	2.138	1.949	1.798	1.631	1.888	2.057	2.333	2.737	2.737
Median	2.470	2.365	2.127	1.872	2.261	2.589	3.035	3.998	3.998
Q3	3.146	2.926	2.685	2.411	2.740	3.280	4.067	5.003	5.003

Table A.158 PFA results (Bldg: Symmetric Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.821	2.502	2.059	1.817	2.397	2.960	3.376	3.916	3.916
1_H2	3.272	2.568	1.827	1.657	2.188	3.035	4.117	5.033	5.033
2_H1	2.195	2.187	1.851	1.626	1.867	2.123	2.559	3.065	3.065
2_H2	2.617	2.352	2.135	1.948	2.232	2.552	2.911	3.564	3.564
3_H1	1.845	1.604	1.405	1.305	1.542	1.630	2.014	2.434	2.434
3_H2	2.133	1.996	1.900	1.876	1.959	1.957	2.319	2.652	2.652
4_H1	4.463	4.456	3.641	2.650	3.224	3.817	4.627	6.137	6.137
4_H2	3.809	3.633	4.316	2.677	3.842	3.544	4.589	6.173	6.173
5_H1	2.296	2.581	2.471	1.908	2.486	2.508	2.745	3.665	3.665
5_H2	2.826	2.540	2.350	1.893	2.372	2.662	3.359	4.599	4.599
6_H1	1.963	1.831	1.843	1.821	1.864	1.906	2.036	2.255	2.255
6_H2	1.896	1.609	1.318	1.261	1.468	1.802	2.056	2.577	2.577
7_H1	2.235	2.112	1.913	1.837	2.107	2.232	2.411	2.931	2.931
7_H2	1.776	1.628	1.406	1.340	1.652	1.838	2.092	2.542	2.542
8_H1	1.915	1.571	1.442	1.337	1.507	1.725	2.186	2.556	2.556
8_H2	2.359	1.760	1.461	1.326	1.762	2.271	2.812	3.451	3.451
9_H1	3.337	2.632	2.245	2.771	3.494	3.804	4.648	5.878	5.878
9_H2	2.680	2.282	2.478	2.594	2.797	3.218	3.992	5.690	5.690
10_H1	5.738	4.695	3.585	2.240	3.088	4.598	6.081	7.202	7.202
10_H2	2.564	2.419	2.173	2.236	2.235	2.374	3.136	4.022	4.022
11_H1	2.243	2.137	2.303	2.492	2.860	2.669	3.176	4.458	4.458
11_H2	4.480	3.893	3.083	2.734	2.753	3.483	4.298	4.701	4.701

Min	1.776	1.571	1.318	1.261	1.468	1.630	2.014	2.255	2.255
Max	5.738	4.695	4.316	2.771	3.842	4.598	6.081	7.202	7.202
Mean	2.794	2.499	2.237	1.970	2.350	2.668	3.252	4.068	4.068
σ	1.024	0.895	0.791	0.509	0.662	0.803	1.104	1.450	1.450
Mean-σ	1.770	1.604	1.445	1.461	1.688	1.865	2.148	2.619	2.619
Mean+σ	3.817	3.395	3.028	2.480	3.012	3.472	4.356	5.518	5.518
Q1	2.148	1.873	1.831	1.634	1.865	1.998	2.342	2.722	2.722
Median	2.461	2.317	2.097	1.884	2.233	2.530	3.024	3.791	3.791
Q3	3.160	2.577	2.441	2.429	2.786	3.172	4.086	4.950	4.950

Table A.159 PFA results (Bldg: T4 Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.070	1.928	1.992	1.658	1.863	2.066	2.483	2.947	2.947
1_H2	2.545	2.368	2.227	1.554	1.744	2.219	2.970	3.500	3.500
2_H1	1.595	1.485	1.590	1.502	1.671	1.833	2.127	2.926	2.926
2_H2	2.160	2.627	2.387	1.712	1.554	1.672	2.034	2.480	2.627
3_H1	1.998	1.443	1.449	1.389	1.679	2.051	2.742	3.278	3.278
3_H2	2.020	1.725	1.506	1.421	1.870	2.204	2.657	3.076	3.076
4_H1	1.534	1.269	1.166	1.137	1.433	1.648	1.904	2.273	2.273
4_H2	1.885	1.611	1.205	1.082	1.247	1.728	2.264	2.664	2.664
5_H1	1.772	1.459	1.286	1.224	1.335	1.571	2.029	2.408	2.408
5_H2	1.105	1.061	0.965	0.776	0.745	0.849	1.079	1.258	1.258
6_H1	2.226	1.683	1.749	1.698	1.833	2.028	2.541	3.151	3.151
6_H2	2.934	2.367	2.292	2.065	2.516	3.025	3.890	5.092	5.092
7_H1	2.457	2.054	2.053	1.763	1.463	1.825	2.686	3.613	3.613
7_H2	3.205	2.988	2.581	1.851	1.653	2.239	3.804	5.050	5.050
8_H1	4.930	4.062	3.857	2.708	2.276	3.051	4.727	6.427	6.427
8_H2	3.175	2.861	2.524	2.182	2.750	3.180	4.167	5.725	5.725
9_H1	1.864	1.579	1.381	1.205	1.579	2.067	2.593	2.991	2.991
9_H2	1.469	1.357	1.227	1.245	1.553	1.696	1.791	2.026	2.026
10_H1	1.711	1.472	1.238	1.184	1.308	1.447	1.778	2.133	2.133
10_H2	1.458	1.189	0.985	1.070	1.263	1.465	1.706	1.884	1.884
11_H1	1.688	1.426	1.258	1.355	1.538	1.765	2.182	2.564	2.564
11_H2	1.447	1.241	1.175	1.275	1.430	1.564	1.896	2.150	2.150

Min	1.105	1.061	0.965	0.776	0.745	0.849	1.079	1.258	1.258
Max	4.930	4.062	3.857	2.708	2.750	3.180	4.727	6.427	6.427
Mean	2.148	1.875	1.731	1.503	1.650	1.963	2.548	3.164	3.171
σ	0.837	0.735	0.699	0.435	0.437	0.555	0.894	1.310	1.307
Mean-σ	1.310	1.140	1.032	1.067	1.213	1.408	1.653	1.854	1.864
Mean+σ	2.985	2.610	2.431	1.938	2.087	2.519	3.442	4.475	4.478
Q1	1.618	1.430	1.230	1.210	1.431	1.654	1.935	2.306	2.306
Median	1.942	1.595	1.477	1.405	1.566	1.829	2.373	2.937	2.937
Q3	2.399	2.289	2.184	1.709	1.811	2.170	2.728	3.444	3.444

Table A.160 PFA results (Bldg: T4 Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.764	2.311	2.027	1.678	1.530	2.076	2.808	3.494	3.494
1_H2	1.792	1.808	1.645	1.605	1.752	1.999	2.530	3.165	3.165
2_H1	2.474	2.515	2.114	1.665	1.609	1.698	2.143	2.420	2.515
2_H2	1.362	1.241	1.373	1.462	1.290	1.260	1.649	2.284	2.284
3_H1	1.821	1.630	1.553	1.452	1.767	1.937	2.469	2.932	2.932
3_H2	1.538	1.352	1.335	1.294	1.683	1.952	2.297	2.777	2.777
4_H1	1.576	1.380	1.090	1.083	1.263	1.514	1.955	2.303	2.303
4_H2	1.496	1.269	1.160	1.142	1.427	1.652	1.925	2.344	2.344
5_H1	0.809	0.883	0.809	0.673	0.765	0.849	0.949	1.159	1.159
5_H2	1.600	1.360	1.193	1.098	1.312	1.554	1.838	2.042	2.042
6_H1	2.634	2.039	2.107	1.872	2.148	2.670	3.730	5.075	5.075
6_H2	2.138	1.688	1.640	1.609	1.593	2.053	2.698	3.324	3.324
7_H1	2.870	2.864	2.358	1.343	1.807	2.182	3.102	3.880	3.880
7_H2	2.518	2.393	1.996	1.666	1.502	1.913	2.914	3.780	3.780
8_H1	3.045	2.601	2.243	2.052	2.378	2.858	4.324	5.435	5.435
8_H2	4.689	4.089	3.727	2.267	2.289	3.015	4.197	5.596	5.596
9_H1	1.275	1.139	1.059	1.051	1.230	1.375	1.521	1.748	1.748
9_H2	1.912	1.517	1.142	1.220	1.531	2.026	2.546	2.988	2.988
10_H1	1.321	1.132	0.928	0.938	1.059	1.179	1.328	1.447	1.447
10_H2	1.620	1.367	1.231	1.171	1.292	1.539	1.855	2.174	2.174
11_H1	1.427	1.223	1.111	1.127	1.407	1.646	1.880	2.175	2.175
11_H2	1.599	1.360	1.250	1.310	1.477	1.683	2.116	2.460	2.460

Min	0.809	0.883	0.809	0.673	0.765	0.849	0.949	1.159	1.159
Max	4.689	4.089	3.727	2.267	2.378	3.015	4.324	5.596	5.596
Mean	2.013	1.780	1.595	1.399	1.550	1.847	2.399	2.955	2.959
σ	0.843	0.753	0.662	0.379	0.381	0.525	0.868	1.204	1.202
Mean-σ	1.170	1.027	0.933	1.020	1.170	1.322	1.531	1.750	1.757
Mean+σ	2.855	2.533	2.257	1.778	1.931	2.371	3.267	4.159	4.161
Q1	1.506	1.290	1.146	1.131	1.297	1.543	1.861	2.203	2.203
Median	1.706	1.449	1.354	1.326	1.516	1.805	2.220	2.618	2.646
Q3	2.507	2.243	2.019	1.651	1.735	2.046	2.781	3.451	3.451

Table A.161 PFA results (Bldg: T4 Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.188	2.049	1.885	1.818	2.344	2.438	2.641	3.180	3.180
1_H2	2.582	2.253	1.939	1.850	2.001	2.550	2.979	3.342	3.342
2_H1	3.488	2.422	2.406	2.157	2.458	2.521	3.126	4.559	4.559
2_H2	2.678	2.749	2.800	2.267	2.457	2.780	2.941	4.158	4.158
3_H1	3.978	3.424	2.695	1.821	2.500	2.758	3.455	4.517	4.517
3_H2	3.511	3.166	2.568	2.023	2.547	3.355	4.059	4.844	4.844
4_H1	1.992	1.942	1.584	1.464	1.810	2.335	2.788	3.197	3.197
4_H2	2.562	2.208	1.879	1.706	1.945	2.314	2.971	3.624	3.624
5_H1	1.903	1.920	1.670	1.271	1.518	2.078	2.562	2.916	2.916
5_H2	1.685	1.655	1.567	1.254	1.510	1.782	2.280	2.661	2.661
6_H1	2.410	1.882	1.585	1.634	1.792	2.354	3.112	3.649	3.649
6_H2	2.583	2.270	2.153	2.174	2.229	2.749	3.348	4.050	4.050
7_H1	1.703	1.485	1.280	1.219	1.462	1.776	1.997	2.455	2.455
7_H2	1.753	1.623	1.577	1.352	1.603	1.817	2.223	2.668	2.668
8_H1	2.051	1.690	2.053	2.231	1.968	2.028	2.493	3.221	3.221
8_H2	2.471	1.962	1.820	1.598	2.307	2.903	3.530	4.099	4.099
9_H1	3.721	4.188	3.683	2.337	3.456	3.846	4.297	5.616	5.616
9_H2	3.389	2.881	2.439	2.536	3.477	3.776	4.062	5.320	5.320
10_H1	3.219	3.510	2.985	3.154	3.138	3.480	4.418	5.937	5.937
10_H2	2.938	2.414	2.356	3.198	3.908	3.852	5.670	7.443	7.443
11_H1	2.962	4.077	3.291	2.269	3.636	4.418	3.839	5.133	5.133
11_H2	2.429	3.876	3.712	1.971	3.712	3.462	2.610	4.851	4.851

Min	1.685	1.485	1.280	1.219	1.462	1.776	1.997	2.455	2.455
Max	3.978	4.188	3.712	3.198	3.908	4.418	5.670	7.443	7.443
Mean	2.645	2.529	2.269	1.968	2.444	2.790	3.246	4.156	4.156
σ	0.682	0.835	0.696	0.546	0.779	0.759	0.873	1.244	1.244
Mean-σ	1.964	1.695	1.574	1.422	1.666	2.031	2.373	2.912	2.912
Mean+σ	3.327	3.364	2.965	2.515	3.223	3.548	4.118	5.401	5.401
Q1	2.085	1.925	1.707	1.607	1.844	2.319	2.618	3.203	3.203
Median	2.572	2.261	2.103	1.911	2.326	2.650	3.046	4.074	4.074
Q3	3.155	3.095	2.664	2.258	2.991	3.436	3.762	4.849	4.849

Table A.162 PFA results (Bldg: T4 Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.436	2.096	1.851	1.712	1.725	2.217	2.629	3.176	3.176
1_H2	2.472	1.972	1.839	1.608	1.966	2.332	3.026	3.528	3.528
2_H1	2.711	2.931	2.863	2.145	2.434	2.694	2.826	3.626	3.626
2_H2	2.962	2.422	2.168	1.917	2.369	2.364	3.305	4.082	4.082
3_H1	3.249	2.820	2.281	1.990	2.422	3.042	3.960	5.061	5.061
3_H2	3.336	2.804	2.422	1.909	2.109	2.652	3.513	4.534	4.534
4_H1	2.243	2.059	1.785	1.740	1.868	2.025	2.467	3.124	3.124
4_H2	2.101	1.628	1.442	1.463	1.744	2.029	2.309	2.659	2.659
5_H1	1.982	1.731	1.515	1.249	1.649	2.072	2.611	3.150	3.150
5_H2	1.968	1.668	1.460	1.401	1.560	1.958	2.399	2.702	2.702
6_H1	2.501	2.150	1.891	1.902	2.318	2.587	3.012	3.597	3.597
6_H2	2.021	2.102	1.804	1.699	1.889	2.313	2.630	3.346	3.346
7_H1	1.670	1.703	1.653	1.390	1.618	1.748	2.052	2.451	2.451
7_H2	1.591	1.384	1.250	1.062	1.332	1.623	1.841	2.105	2.105
8_H1	2.289	1.770	1.686	1.515	1.934	2.530	3.273	3.984	3.984
8_H2	1.940	1.874	2.181	1.956	2.043	2.133	2.778	3.420	3.420
9_H1	3.696	2.971	2.508	2.661	3.024	3.450	3.967	4.811	4.811
9_H2	4.016	4.093	3.464	2.070	2.977	3.456	3.469	4.708	4.708
10_H1	2.679	2.615	2.587	2.960	3.359	3.872	5.339	6.741	6.741
10_H2	3.170	3.447	2.948	3.388	3.005	3.288	4.338	5.870	5.870
11_H1	2.212	2.264	2.003	1.786	2.185	2.138	2.643	3.597	3.597
11_H2	2.741	3.169	2.520	1.920	2.984	2.989	3.473	5.405	5.405

Min	1.591	1.384	1.250	1.062	1.332	1.623	1.841	2.105	2.105
Max	4.016	4.093	3.464	3.388	3.359	3.872	5.339	6.741	6.741
Mean	2.545	2.349	2.096	1.884	2.205	2.523	3.084	3.894	3.894
σ	0.644	0.684	0.558	0.543	0.562	0.602	0.812	1.163	1.163
Mean-σ	1.901	1.665	1.538	1.341	1.643	1.922	2.273	2.731	2.731
Mean+σ	3.189	3.033	2.654	2.426	2.767	3.125	3.896	5.058	5.058
Q1	2.041	1.796	1.711	1.538	1.775	2.087	2.615	3.156	3.156
Median	2.454	2.126	1.947	1.844	2.076	2.348	2.919	3.597	3.597
Q3	2.907	2.816	2.486	1.981	2.431	2.915	3.472	4.665	4.665

Table A.163 PFA results (Bldg: T4 Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.706	3.070	2.212	1.897	2.551	3.306	4.151	4.982	4.982
1_H2	2.922	2.516	2.058	2.184	2.461	3.051	3.443	3.877	3.877
2_H1	2.876	2.819	2.535	2.098	2.570	2.827	3.663	4.414	4.414
2_H2	2.351	2.181	1.788	1.663	1.874	2.155	2.688	3.433	3.433
3_H1	2.166	2.142	2.062	1.921	2.101	2.116	2.576	2.970	2.970
3_H2	2.082	1.973	1.783	1.537	1.682	1.877	2.298	2.626	2.626
4_H1	4.485	5.406	5.219	3.755	5.694	5.247	4.907	8.874	8.874
4_H2	5.215	6.190	5.922	3.011	5.781	5.923	5.854	10.604	10.604
5_H1	2.990	3.464	3.134	2.367	2.863	3.111	3.728	4.566	4.566
5_H2	2.490	3.565	3.208	2.235	3.387	3.646	3.066	4.542	4.542
6_H1	1.915	1.813	1.723	1.476	1.855	2.063	2.121	2.624	2.624
6_H2	2.121	2.039	1.951	1.955	1.922	2.086	2.320	2.765	2.765
7_H1	2.097	1.900	1.586	1.513	1.822	2.184	2.579	2.885	2.885
7_H2	2.294	2.067	1.936	1.813	2.176	2.383	2.616	3.109	3.109
8_H1	3.057	2.472	1.944	1.341	1.895	2.495	3.414	4.198	4.198
8_H2	2.053	1.749	1.417	1.333	1.794	2.126	2.502	2.903	2.903
9_H1	3.282	3.266	2.607	2.809	3.249	3.953	5.044	6.392	6.392
9_H2	4.039	3.153	2.998	3.017	3.763	4.024	6.041	7.903	7.903
10_H1	3.927	3.118	2.293	2.103	2.346	3.134	3.953	4.942	4.942
10_H2	5.568	4.904	3.892	2.474	2.748	4.338	5.610	6.795	6.795
11_H1	4.364	3.505	2.859	2.767	2.986	3.523	4.560	5.592	5.592
11_H2	3.129	2.554	3.083	3.206	2.729	2.968	3.647	4.291	4.291

Min	1.915	1.749	1.417	1.333	1.682	1.877	2.121	2.624	2.624
Max	5.568	6.190	5.922	3.755	5.781	5.923	6.041	10.604	10.604
Mean	3.142	2.994	2.646	2.203	2.738	3.115	3.672	4.786	4.786
σ	1.070	1.189	1.140	0.661	1.125	1.079	1.217	2.158	2.158
Mean-σ	2.072	1.805	1.506	1.543	1.614	2.037	2.455	2.628	2.628
Mean+σ	4.212	4.183	3.786	2.864	3.863	4.194	4.889	6.944	6.944
Q1	2.198	2.086	1.938	1.701	1.901	2.163	2.588	3.005	3.005
Median	2.956	2.687	2.252	2.100	2.506	3.010	3.545	4.353	4.353
Q3	3.872	3.414	3.062	2.694	2.955	3.616	4.458	5.439	5.439

Table A.164 PFA results (Bldg: T4 Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.845	2.385	1.937	1.896	2.178	2.922	3.330	3.760	3.760
1_H2	3.471	2.832	1.966	1.853	2.426	3.122	4.127	5.188	5.188
2_H1	2.742	2.308	1.752	1.586	1.861	2.459	3.037	3.482	3.482
2_H2	2.576	2.372	2.178	2.025	2.325	2.512	2.799	3.490	3.490
3_H1	1.826	1.580	1.338	1.245	1.530	1.839	2.153	2.554	2.554
3_H2	2.163	2.035	2.007	1.940	2.072	2.043	2.334	2.711	2.711
4_H1	4.848	4.558	4.444	2.804	4.121	4.461	6.040	7.890	7.890
4_H2	4.320	4.969	4.564	2.762	4.095	4.091	6.291	8.852	8.852
5_H1	2.145	2.413	2.172	1.980	2.301	2.354	2.851	4.076	4.076
5_H2	2.966	2.787	2.617	2.001	2.340	2.735	3.347	4.333	4.333
6_H1	2.092	2.013	1.823	1.782	1.965	2.112	2.194	2.337	2.337
6_H2	1.897	1.603	1.462	1.413	1.535	1.713	2.226	2.862	2.862
7_H1	2.410	2.215	1.882	1.858	2.022	2.296	2.527	3.229	3.229
7_H2	1.915	1.874	1.587	1.350	1.727	1.847	2.077	2.613	2.613
8_H1	2.045	1.847	1.637	1.366	1.569	1.798	2.153	2.601	2.601
8_H2	2.615	2.156	1.635	1.480	1.753	2.289	2.877	3.585	3.585
9_H1	3.504	2.781	2.614	2.743	3.529	3.730	5.004	6.403	6.403
9_H2	2.789	3.152	2.402	2.453	3.213	3.446	4.488	5.951	5.951
10_H1	5.704	4.894	3.979	2.398	3.161	4.813	5.826	6.628	6.628
10_H2	2.745	2.518	2.400	2.044	2.250	2.662	3.409	4.617	4.617
11_H1	2.187	2.089	2.202	2.292	2.557	2.610	3.559	4.493	4.493
11_H2	4.865	3.808	3.133	2.879	2.985	3.938	4.783	5.233	5.233

Min	1.826	1.580	1.338	1.245	1.530	1.713	2.077	2.337	2.337
Max	5.704	4.969	4.564	2.879	4.121	4.813	6.291	8.852	8.852
Mean	2.940	2.690	2.351	2.007	2.433	2.809	3.520	4.404	4.404
σ	1.087	1.001	0.912	0.502	0.774	0.905	1.341	1.803	1.803
Mean-σ	1.852	1.690	1.439	1.505	1.658	1.903	2.178	2.601	2.601
Mean+σ	4.027	3.691	3.264	2.508	3.207	3.714	4.861	6.207	6.207
Q1	2.150	2.049	1.770	1.635	1.887	2.157	2.382	2.954	2.954
Median	2.679	2.379	2.090	1.960	2.276	2.561	3.183	3.918	3.918
Q3	3.344	2.821	2.561	2.371	2.878	3.365	4.397	5.221	5.221

Table A.165 PFA results (Bldg: U4 Mass – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.863	1.741	1.788	1.543	1.958	2.052	2.149	2.719	2.719
1_H2	2.317	2.037	2.311	1.959	1.668	1.872	2.686	3.352	3.352
2_H1	1.517	1.269	1.464	1.377	1.335	1.160	1.584	2.285	2.285
2_H2	1.736	1.975	2.021	1.606	1.708	1.816	1.905	2.478	2.478
3_H1	1.949	1.618	1.544	1.164	1.616	1.948	2.512	2.962	2.962
3_H2	1.817	1.466	1.554	1.507	1.661	1.728	2.161	2.673	2.673
4_H1	1.660	1.305	1.201	1.077	1.441	1.702	2.018	2.477	2.477
4_H2	1.567	1.354	1.057	1.055	1.218	1.548	1.983	2.321	2.321
5_H1	1.616	1.484	1.260	1.143	1.250	1.628	1.834	2.171	2.171
5_H2	0.777	0.835	0.838	0.759	0.835	0.941	1.044	1.303	1.303
6_H1	2.224	1.703	1.565	1.378	1.546	1.846	2.255	2.703	2.703
6_H2	2.621	2.118	2.060	2.115	2.057	2.636	3.648	4.921	4.921
7_H1	2.392	1.940	1.951	1.749	1.569	1.939	2.594	3.461	3.461
7_H2	2.630	2.462	2.137	1.330	1.654	2.148	3.143	4.032	4.032
8_H1	4.164	3.817	3.532	2.264	2.229	2.996	4.038	5.882	5.882
8_H2	3.381	2.830	2.816	2.142	2.502	3.157	4.407	5.653	5.653
9_H1	2.342	1.978	1.486	1.214	1.898	2.496	3.060	3.563	3.563
9_H2	1.915	1.453	1.082	0.960	1.317	1.623	2.020	2.388	2.388
10_H1	1.729	1.403	1.199	1.142	1.238	1.547	1.815	2.241	2.241
10_H2	1.442	1.305	1.122	0.960	1.091	1.191	1.417	1.606	1.606
11_H1	1.722	1.452	1.240	1.254	1.392	1.640	2.115	2.525	2.525
11_H2	1.625	1.216	1.065	1.049	1.239	1.455	1.770	2.103	2.103

Min	0.777	0.835	0.838	0.759	0.835	0.941	1.044	1.303	1.303
Max	4.164	3.817	3.532	2.264	2.502	3.157	4.407	5.882	5.882
Mean	2.046	1.762	1.650	1.398	1.565	1.867	2.371	2.992	2.992
σ	0.713	0.643	0.646	0.420	0.392	0.555	0.840	1.196	1.196
Mean-σ	1.333	1.119	1.004	0.977	1.173	1.312	1.531	1.796	1.796
Mean+σ	2.758	2.405	2.295	1.818	1.957	2.421	3.211	4.188	4.188
Q1	1.633	1.366	1.199	1.093	1.266	1.566	1.852	2.294	2.294
Median	1.840	1.551	1.515	1.292	1.557	1.772	2.132	2.599	2.599
Q3	2.335	1.977	2.003	1.590	1.698	2.026	2.663	3.433	3.433

Table A.166 PFA results (Bldg: U4 Mass – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.905	2.320	2.085	1.650	1.438	1.962	3.062	3.908	3.908
1_H2	1.922	1.821	1.645	1.459	1.549	1.884	2.369	2.816	2.816
2_H1	1.917	2.049	1.665	1.368	1.532	1.586	1.924	2.451	2.451
2_H2	1.397	1.138	1.359	1.329	1.230	1.297	1.696	2.214	2.214
3_H1	1.903	1.639	1.509	1.341	1.659	1.770	2.200	2.649	2.649
3_H2	1.761	1.553	1.270	1.194	1.698	2.086	2.433	2.760	2.760
4_H1	1.444	1.184	1.046	1.009	1.207	1.523	1.806	2.024	2.024
4_H2	1.382	1.191	1.100	0.980	1.219	1.419	1.707	2.087	2.087
5_H1	0.812	0.758	0.770	0.698	0.792	0.914	0.921	1.105	1.105
5_H2	1.682	1.369	1.166	1.046	1.309	1.572	1.868	2.203	2.203
6_H1	2.326	2.048	1.682	1.859	2.008	2.068	3.115	4.065	4.065
6_H2	2.325	1.880	1.690	1.397	1.629	2.023	2.659	3.420	3.420
7_H1	2.675	2.475	2.092	1.331	1.856	2.479	3.394	4.127	4.127
7_H2	2.046	2.047	1.907	1.499	1.511	1.825	2.456	3.179	3.179
8_H1	2.976	2.508	2.224	1.918	2.132	2.631	3.822	4.965	4.965
8_H2	4.474	4.158	3.855	2.219	2.244	3.063	4.468	5.562	5.562
9_H1	1.539	1.207	1.005	1.032	1.188	1.485	1.809	2.054	2.054
9_H2	1.897	1.439	1.196	1.061	1.533	1.870	2.392	2.812	2.812
10_H1	1.291	1.122	0.978	0.867	0.990	1.251	1.420	1.516	1.516
10_H2	1.577	1.282	1.171	1.125	1.251	1.461	1.737	2.081	2.081
11_H1	1.491	1.224	1.076	1.046	1.202	1.451	1.689	1.951	1.951
11_H2	1.706	1.369	1.258	1.196	1.299	1.528	1.949	2.328	2.328

Min	0.812	0.758	0.770	0.698	0.792	0.914	0.921	1.105	1.105
Max	4.474	4.158	3.855	2.219	2.244	3.063	4.468	5.562	5.562
Mean	1.975	1.717	1.534	1.301	1.476	1.779	2.313	2.831	2.831
σ	0.770	0.727	0.657	0.365	0.361	0.490	0.836	1.111	1.111
Mean-σ	1.205	0.990	0.877	0.937	1.115	1.289	1.478	1.720	1.720
Mean+σ	2.745	2.445	2.191	1.666	1.837	2.270	3.149	3.942	3.942
Q1	1.503	1.211	1.117	1.046	1.222	1.467	1.755	2.083	2.083
Median	1.829	1.496	1.315	1.262	1.475	1.678	2.074	2.550	2.550
Q3	2.255	2.048	1.688	1.443	1.651	2.007	2.608	3.359	3.359

Table A.167 PFA results (Bldg: U4 Mass – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.328	1.866	1.860	1.779	1.703	2.018	2.529	3.342	3.342
1_H2	2.354	2.061	1.675	1.788	1.835	2.178	2.555	3.009	3.009
2_H1	3.362	2.585	1.871	1.630	2.169	2.691	3.514	4.550	4.550
2_H2	2.492	2.663	2.454	1.925	2.648	2.959	2.812	3.772	3.772
3_H1	2.999	2.902	2.483	2.094	2.199	2.657	3.684	4.802	4.802
3_H2	3.515	3.225	2.649	2.101	2.826	3.622	3.754	4.575	4.575
4_H1	2.576	2.099	1.404	1.449	1.731	2.439	3.115	3.650	3.650
4_H2	2.141	1.912	1.858	1.676	1.870	2.059	2.343	2.950	2.950
5_H1	2.182	1.883	1.521	1.578	1.731	2.262	2.611	2.814	2.814
5_H2	1.756	1.450	1.467	1.373	1.544	1.734	2.126	2.540	2.540
6_H1	2.039	1.901	1.668	1.642	1.724	2.007	2.633	3.218	3.218
6_H2	2.476	2.041	1.911	1.785	2.178	2.543	3.095	3.648	3.648
7_H1	1.946	1.505	1.251	1.101	1.338	1.739	2.216	2.629	2.629
7_H2	1.807	1.653	1.476	1.332	1.573	1.811	2.221	2.607	2.607
8_H1	1.827	1.778	1.841	2.009	2.198	1.830	2.408	3.137	3.137
8_H2	2.338	1.711	1.716	1.511	1.669	2.466	3.327	3.895	3.895
9_H1	3.174	3.432	3.398	2.104	3.003	3.441	3.248	4.312	4.312
9_H2	3.631	2.999	2.878	2.377	3.094	4.061	4.628	5.528	5.528
10_H1	3.606	3.252	3.414	3.723	3.223	3.297	4.662	6.714	6.714
10_H2	2.930	2.441	2.552	2.724	3.673	3.776	4.911	7.034	7.034
11_H1	2.688	3.286	3.347	2.140	3.492	3.806	3.310	5.684	5.684
11_H2	2.475	2.845	3.149	1.672	2.574	3.070	2.731	3.696	3.696

Min	1.756	1.450	1.251	1.101	1.338	1.734	2.126	2.540	2.540
Max	3.631	3.432	3.414	3.723	3.673	4.061	4.911	7.034	7.034
Mean	2.575	2.340	2.175	1.887	2.272	2.658	3.111	4.005	4.005
σ	0.593	0.640	0.705	0.552	0.688	0.741	0.815	1.286	1.286
Mean-σ	1.981	1.701	1.469	1.335	1.584	1.917	2.295	2.718	2.718
Mean+σ	3.168	2.980	2.880	2.439	2.961	3.398	3.926	5.291	5.291
Q1	2.151	1.870	1.670	1.591	1.726	2.029	2.535	3.041	3.041
Median	2.476	2.080	1.865	1.782	2.173	2.505	2.953	3.673	3.673
Q3	2.982	2.887	2.624	2.099	2.782	3.240	3.467	4.569	4.569

Table A.168 PFA results (Bldg: U4 Mass – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.519	2.110	1.837	1.708	1.802	2.167	2.869	3.418	3.418
1_H2	2.326	1.971	1.579	1.559	1.858	2.190	2.738	3.460	3.460
2_H1	2.527	2.696	2.588	1.850	2.445	2.856	2.971	4.124	4.124
2_H2	2.792	2.165	1.983	1.632	2.313	2.409	2.999	4.051	4.051
3_H1	2.968	2.788	2.182	1.750	2.483	3.081	3.651	4.721	4.721
3_H2	2.873	2.759	2.058	1.652	2.042	2.435	3.453	4.326	4.326
4_H1	2.307	2.011	1.706	1.598	1.923	2.298	2.569	3.052	3.052
4_H2	2.043	1.669	1.442	1.342	1.620	2.031	2.382	2.749	2.749
5_H1	1.805	1.703	1.583	1.324	1.739	1.987	2.321	2.876	2.876
5_H2	1.893	1.634	1.306	1.396	1.587	2.005	2.360	2.587	2.587
6_H1	2.339	2.130	1.893	1.892	2.296	2.497	2.940	3.524	3.524
6_H2	2.011	1.861	1.651	1.403	1.753	2.343	2.716	2.987	2.987
7_H1	1.725	1.716	1.476	1.221	1.576	1.849	2.272	2.654	2.654
7_H2	1.866	1.467	1.191	1.068	1.187	1.491	1.932	2.275	2.275
8_H1	2.196	1.595	1.511	1.385	1.769	2.464	3.200	3.785	3.785
8_H2	1.756	1.512	1.804	1.824	1.802	1.700	2.385	2.837	2.837
9_H1	2.898	2.715	2.023	2.322	2.598	3.070	3.608	4.502	4.502
9_H2	3.417	3.568	3.179	1.984	3.073	3.483	3.667	4.517	4.517
10_H1	2.252	2.476	2.639	2.385	3.204	3.425	3.815	5.125	5.125
10_H2	2.522	2.922	2.809	3.036	2.848	2.911	3.921	5.557	5.557
11_H1	1.976	2.476	2.106	1.636	2.455	2.732	2.442	3.995	3.995
11_H2	2.580	4.153	3.423	1.977	3.097	2.959	3.208	5.154	5.154

Min	1.725	1.467	1.191	1.068	1.187	1.491	1.932	2.275	2.275
Max	3.417	4.153	3.423	3.036	3.204	3.483	3.921	5.557	5.557
Mean	2.345	2.277	1.999	1.725	2.158	2.472	2.928	3.740	3.740
σ	0.453	0.693	0.596	0.441	0.561	0.540	0.573	0.938	0.938
Mean-σ	1.892	1.585	1.402	1.284	1.597	1.932	2.355	2.802	2.802
Mean+σ	2.798	2.970	2.595	2.166	2.718	3.012	3.501	4.678	4.678
Q1	1.985	1.706	1.580	1.398	1.757	2.065	2.399	2.904	2.904
Median	2.316	2.120	1.865	1.644	1.982	2.422	2.905	3.654	3.654
Q3	2.567	2.711	2.163	1.881	2.476	2.897	3.391	4.458	4.458

Table A.169 PFA results (Bldg: U4 Mass – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.253	2.610	2.081	1.565	2.560	3.473	4.253	5.322	5.322
1_H2	2.516	2.107	1.997	1.859	2.105	2.639	3.000	3.623	3.623
2_H1	2.455	2.320	2.188	2.139	2.409	2.520	2.659	3.299	3.299
2_H2	1.960	1.800	1.667	1.483	1.823	2.191	2.415	2.754	2.754
3_H1	2.187	2.050	1.972	2.018	2.205	2.312	2.570	2.990	2.990
3_H2	1.889	1.619	1.370	1.256	1.439	1.812	2.226	2.530	2.530
4_H1	4.030	4.978	4.986	2.986	4.788	4.935	4.907	7.917	7.917
4_H2	4.716	5.333	5.543	3.555	6.239	6.225	4.924	9.638	9.638
5_H1	2.625	2.970	3.018	2.057	2.542	3.571	3.422	4.876	4.876
5_H2	2.268	3.375	3.418	1.923	2.840	2.990	2.794	4.435	4.435
6_H1	2.047	1.693	1.455	1.421	1.813	1.954	2.208	2.699	2.699
6_H2	2.389	2.298	2.112	2.065	2.260	2.477	2.653	2.759	2.759
7_H1	1.720	1.638	1.509	1.453	1.697	1.844	2.035	2.461	2.461
7_H2	2.321	2.129	2.020	2.003	2.142	2.400	2.658	2.982	2.982
8_H1	2.798	2.189	1.594	1.432	1.958	2.676	3.524	4.363	4.363
8_H2	2.133	1.826	1.618	1.424	1.731	2.090	2.393	2.689	2.689
9_H1	2.991	3.380	2.999	2.788	3.648	4.667	4.424	6.036	6.036
9_H2	3.377	2.827	2.806	2.659	3.140	3.864	5.341	7.147	7.147
10_H1	2.782	2.073	1.928	2.186	2.579	2.599	3.371	4.084	4.084
10_H2	5.580	5.137	4.131	2.430	2.915	5.011	6.216	7.480	7.480
11_H1	4.332	3.524	3.245	3.140	2.937	3.326	4.469	5.574	5.574
11_H2	2.350	1.984	2.162	2.455	2.542	2.516	3.160	4.345	4.345

Min	1.720	1.619	1.370	1.256	1.439	1.812	2.035	2.461	2.461
Max	5.580	5.333	5.543	3.555	6.239	6.225	6.216	9.638	9.638
Mean	2.851	2.721	2.537	2.104	2.650	3.095	3.437	4.546	4.546
σ	1.000	1.138	1.141	0.628	1.090	1.185	1.171	2.023	2.023
Mean-σ	1.851	1.583	1.396	1.476	1.560	1.911	2.267	2.523	2.523
Mean+σ	3.851	3.859	3.678	2.733	3.741	4.280	4.608	6.568	6.568
Q1	2.207	2.000	1.732	1.504	1.995	2.334	2.591	2.815	2.815
Median	2.486	2.243	2.097	2.038	2.476	2.619	3.080	4.215	4.215
Q3	3.188	3.274	3.013	2.449	2.896	3.547	4.382	5.511	5.511

Table A.170 PFA results (Bldg: U4 Mass – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.586	2.257	1.928	1.859	2.168	2.688	3.296	3.948	3.948
1_H2	2.984	2.206	1.642	1.475	1.983	2.954	3.987	4.849	4.849
2_H1	2.241	2.058	1.715	1.432	1.835	2.189	2.685	3.000	3.000
2_H2	2.484	2.182	1.891	1.905	2.271	2.564	2.810	3.237	3.237
3_H1	1.806	1.602	1.433	1.272	1.546	1.736	1.980	2.316	2.316
3_H2	1.959	1.894	1.792	1.914	1.953	2.105	2.303	2.466	2.466
4_H1	4.149	4.005	3.819	2.932	4.132	4.119	5.686	8.797	8.797
4_H2	3.961	4.991	4.395	2.832	4.316	4.744	4.635	7.640	7.640
5_H1	2.118	2.876	2.686	1.716	2.355	2.611	3.045	4.167	4.167
5_H2	2.785	2.753	2.510	1.784	2.335	2.934	3.103	4.161	4.161
6_H1	2.107	1.945	1.794	1.887	2.051	2.199	2.356	2.483	2.483
6_H2	1.828	1.550	1.313	1.247	1.601	1.878	2.016	2.497	2.497
7_H1	2.463	2.350	2.101	1.945	2.186	2.461	2.628	2.968	2.968
7_H2	1.852	1.707	1.429	1.348	1.675	1.910	2.139	2.573	2.573
8_H1	1.908	1.606	1.403	1.425	1.549	1.848	2.192	2.440	2.440
8_H2	2.125	1.671	1.378	1.243	1.573	1.945	2.470	3.112	3.112
9_H1	2.495	2.401	2.448	2.664	3.376	3.208	4.222	5.689	5.689
9_H2	2.704	2.560	2.805	2.382	2.732	2.967	3.862	5.742	5.742
10_H1	5.302	4.304	3.517	2.346	3.011	4.708	5.610	6.765	6.765
10_H2	2.780	2.364	2.125	1.750	2.136	2.446	3.056	3.927	3.927
11_H1	2.500	2.023	2.066	2.234	2.606	2.322	2.947	3.831	3.831
11_H2	4.125	3.202	2.778	2.831	2.569	3.304	4.414	5.067	5.067

Min	1.806	1.550	1.313	1.243	1.546	1.736	1.980	2.316	2.316
Max	5.302	4.991	4.395	2.932	4.316	4.744	5.686	8.797	8.797
Mean	2.694	2.478	2.226	1.928	2.362	2.720	3.247	4.167	4.167
σ	0.912	0.916	0.834	0.542	0.770	0.865	1.103	1.810	1.810
Mean-σ	1.782	1.561	1.392	1.386	1.592	1.855	2.145	2.357	2.357
Mean+σ	3.606	3.394	3.060	2.470	3.132	3.585	4.350	5.977	5.977
Q1	2.110	1.907	1.660	1.443	1.865	2.126	2.384	2.672	2.672
Median	2.489	2.231	1.997	1.873	2.177	2.512	2.996	3.879	3.879
Q3	2.784	2.705	2.642	2.318	2.597	2.963	3.956	5.013	5.013

Table A.171 PFA results (Bldg: U4 Group 1 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.823	1.569	1.608	1.513	1.557	1.720	2.083	2.588	2.588
1_H2	2.014	1.711	1.950	1.812	1.506	1.694	2.353	2.996	2.996
2_H1	1.262	1.125	1.350	1.398	1.226	1.205	1.652	2.163	2.163
2_H2	1.699	1.801	1.792	1.544	1.496	1.592	1.885	2.366	2.366
3_H1	1.791	1.471	1.358	1.120	1.406	1.845	2.442	2.926	2.926
3_H2	1.633	1.421	1.454	1.419	1.530	1.617	2.118	2.609	2.609
4_H1	1.580	1.294	1.209	1.044	1.363	1.617	1.901	2.317	2.317
4_H2	1.506	1.245	1.080	1.042	1.226	1.534	1.960	2.280	2.280
5_H1	1.613	1.364	1.193	1.075	1.194	1.500	1.755	2.091	2.091
5_H2	0.806	0.851	0.835	0.738	0.762	0.877	1.025	1.129	1.129
6_H1	1.758	1.560	1.542	1.372	1.480	1.686	2.156	2.595	2.595
6_H2	2.627	2.108	1.980	1.855	2.092	2.462	3.569	4.695	4.695
7_H1	2.189	2.021	1.860	1.509	1.475	1.938	2.597	3.449	3.449
7_H2	2.620	2.475	2.205	1.438	1.561	2.031	3.101	3.867	3.867
8_H1	4.241	3.662	3.516	2.189	2.057	2.792	4.009	5.173	5.173
8_H2	3.024	2.490	2.151	1.991	2.434	2.835	4.145	5.368	5.368
9_H1	2.135	1.734	1.312	1.052	1.594	2.162	2.796	3.299	3.299
9_H2	1.383	1.195	1.070	1.001	1.287	1.464	1.747	1.993	1.993
10_H1	1.642	1.385	1.177	1.119	1.222	1.521	1.770	2.131	2.131
10_H2	1.283	1.175	1.044	0.910	1.024	1.222	1.476	1.655	1.655
11_H1	1.716	1.408	1.233	1.256	1.394	1.580	2.084	2.510	2.510
11_H2	1.459	1.199	1.102	1.060	1.273	1.478	1.708	2.021	2.021

Min	0.806	0.851	0.835	0.738	0.762	0.877	1.025	1.129	1.129
Max	4.241	3.662	3.516	2.189	2.434	2.835	4.145	5.368	5.368
Mean	1.900	1.648	1.546	1.339	1.462	1.744	2.288	2.828	2.828
σ	0.723	0.616	0.586	0.373	0.362	0.479	0.801	1.097	1.097
Mean-σ	1.177	1.032	0.960	0.965	1.100	1.265	1.487	1.731	1.731
Mean+σ	2.623	2.264	2.132	1.712	1.823	2.223	3.089	3.925	3.925
Q1	1.525	1.257	1.181	1.054	1.238	1.506	1.759	2.139	2.139
Median	1.707	1.446	1.354	1.314	1.441	1.617	2.083	2.549	2.549
Q3	2.105	1.784	1.843	1.512	1.551	1.914	2.558	3.223	3.223

Table A.172 PFA results (Bldg: U4 Group 1 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.511	2.478	2.367	1.506	1.513	1.950	2.708	3.345	3.345
1_H2	1.821	1.932	1.817	1.359	1.546	1.894	2.241	2.670	2.670
2_H1	1.980	2.154	1.745	1.399	1.576	1.603	1.879	2.458	2.458
2_H2	1.335	1.181	1.453	1.275	1.256	1.233	1.584	2.154	2.154
3_H1	1.727	1.462	1.454	1.306	1.603	1.727	2.193	2.645	2.645
3_H2	1.691	1.425	1.198	1.095	1.577	1.953	2.335	2.702	2.702
4_H1	1.407	1.142	1.049	1.029	1.244	1.487	1.748	2.052	2.052
4_H2	1.381	1.179	1.085	1.022	1.234	1.439	1.751	2.143	2.143
5_H1	0.756	0.866	0.889	0.688	0.883	0.916	0.898	1.057	1.057
5_H2	1.652	1.502	1.250	1.054	1.406	1.633	1.804	2.159	2.159
6_H1	2.273	2.124	1.724	1.667	1.759	2.155	3.227	4.079	4.079
6_H2	2.079	1.743	1.617	1.400	1.501	1.905	2.530	3.380	3.380
7_H1	2.511	2.435	2.030	1.293	1.711	2.229	3.098	3.784	3.784
7_H2	2.086	2.013	1.860	1.472	1.508	1.832	2.482	3.233	3.233
8_H1	2.881	2.824	2.373	1.953	2.145	2.561	3.823	5.170	5.170
8_H2	4.321	4.372	3.992	2.077	2.645	3.052	4.243	5.458	5.458
9_H1	1.287	1.169	1.054	0.980	1.183	1.383	1.554	1.722	1.722
9_H2	1.717	1.450	1.205	1.060	1.540	1.866	2.150	2.473	2.473
10_H1	1.272	1.131	0.937	0.839	1.011	1.204	1.351	1.507	1.507
10_H2	1.610	1.308	1.165	1.115	1.275	1.436	1.744	2.106	2.106
11_H1	1.396	1.209	1.080	1.036	1.255	1.450	1.684	1.962	1.962
11_H2	1.639	1.326	1.245	1.202	1.319	1.531	1.953	2.342	2.342

Min	0.756	0.866	0.889	0.688	0.883	0.916	0.898	1.057	1.057
Max	4.321	4.372	3.992	2.077	2.645	3.052	4.243	5.458	5.458
Mean	1.879	1.747	1.572	1.265	1.486	1.747	2.226	2.755	2.755
σ	0.732	0.786	0.694	0.334	0.374	0.474	0.803	1.100	1.100
Mean-σ	1.146	0.961	0.878	0.930	1.112	1.273	1.424	1.654	1.654
Mean+σ	2.611	2.532	2.266	1.599	1.860	2.222	3.029	3.855	3.855
Q1	1.399	1.188	1.105	1.040	1.255	1.442	1.745	2.115	2.115
Median	1.704	1.456	1.352	1.238	1.504	1.680	2.052	2.466	2.466
Q3	2.085	2.096	1.799	1.399	1.577	1.939	2.518	3.317	3.317

Table A.173 PFA results (Bldg: U4 Group 1 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.074	1.772	1.587	1.607	1.722	1.999	2.366	3.022	3.022
1_H2	2.202	1.957	1.654	1.648	1.610	2.013	2.372	2.857	2.857
2_H1	3.202	2.467	1.785	1.481	2.093	2.274	3.270	4.060	4.060
2_H2	2.317	2.444	2.385	1.814	2.107	2.461	2.620	3.576	3.576
3_H1	3.009	2.473	2.188	1.798	1.911	2.416	3.494	4.237	4.237
3_H2	3.153	2.887	2.190	1.961	2.371	3.076	3.488	4.371	4.371
4_H1	2.428	2.067	1.554	1.402	1.825	2.475	2.853	3.051	3.051
4_H2	2.143	1.985	1.799	1.573	1.726	2.002	2.294	2.909	2.909
5_H1	2.068	1.776	1.378	1.398	1.614	2.105	2.473	2.741	2.741
5_H2	1.647	1.505	1.511	1.357	1.542	1.648	2.058	2.458	2.458
6_H1	1.958	1.650	1.464	1.513	1.639	2.003	2.597	3.060	3.060
6_H2	2.311	1.988	1.861	1.726	2.142	2.300	2.943	3.480	3.480
7_H1	1.777	1.548	1.268	1.120	1.237	1.642	2.037	2.350	2.350
7_H2	1.672	1.565	1.529	1.335	1.588	1.733	2.135	2.548	2.548
8_H1	1.675	1.545	1.714	1.894	1.816	1.756	2.358	3.029	3.029
8_H2	2.151	1.677	1.571	1.394	1.643	2.322	3.253	3.927	3.927
9_H1	2.940	3.294	3.260	2.229	2.774	2.980	3.303	4.141	4.141
9_H2	3.284	2.595	2.326	2.301	2.838	3.214	3.909	4.939	4.939
10_H1	3.234	2.966	2.916	3.259	2.712	2.881	4.186	5.850	5.850
10_H2	2.465	2.360	2.128	2.629	2.803	3.112	4.408	5.826	5.826
11_H1	2.466	2.597	2.368	1.877	2.130	2.542	3.344	4.392	4.392
11_H2	2.398	2.106	1.683	1.547	1.654	2.045	2.517	3.323	3.323

Min	1.647	1.505	1.268	1.120	1.237	1.642	2.037	2.350	2.350
Max	3.284	3.294	3.260	3.259	2.838	3.214	4.408	5.850	5.850
Mean	2.390	2.147	1.914	1.766	1.977	2.318	2.922	3.643	3.643
σ	0.533	0.516	0.506	0.488	0.463	0.485	0.691	1.002	1.002
Mean-σ	1.857	1.630	1.408	1.279	1.514	1.833	2.231	2.641	2.641
Mean+σ	2.922	2.663	2.420	2.254	2.440	2.804	3.613	4.645	4.645
Q1	2.070	1.701	1.558	1.421	1.640	2.003	2.368	2.937	2.937
Median	2.314	2.028	1.750	1.628	1.821	2.287	2.737	3.402	3.402
Q3	2.821	2.472	2.189	1.890	2.139	2.525	3.334	4.213	4.213

Table A.174 PFA results (Bldg: U4 Group 1 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.405	2.021	1.844	1.640	1.828	2.076	2.808	3.358	3.358
1_H2	2.196	1.766	1.530	1.469	1.672	2.054	2.566	3.101	3.101
2_H1	2.559	2.822	2.716	1.803	2.893	3.231	2.870	4.608	4.608
2_H2	2.719	2.061	2.065	1.515	2.598	2.731	2.962	4.281	4.281
3_H1	2.864	2.623	2.062	1.686	2.815	3.264	3.541	4.881	4.881
3_H2	2.793	2.954	2.416	1.569	2.392	2.757	3.473	4.745	4.745
4_H1	2.169	1.987	1.805	1.537	1.988	2.290	2.407	2.947	2.947
4_H2	1.882	1.764	1.449	1.352	1.714	2.028	2.158	2.615	2.615
5_H1	1.739	1.555	1.468	1.269	1.537	1.813	2.230	2.627	2.627
5_H2	1.825	1.577	1.283	1.306	1.595	1.987	2.262	2.459	2.459
6_H1	2.298	2.145	1.892	1.853	2.373	2.529	2.741	3.453	3.453
6_H2	1.851	1.543	1.498	1.421	1.734	2.118	2.424	2.788	2.788
7_H1	1.758	1.705	1.495	1.196	1.587	1.846	2.023	2.409	2.409
7_H2	1.698	1.439	1.187	1.046	1.160	1.459	1.794	2.055	2.055
8_H1	2.144	1.620	1.475	1.342	1.777	2.500	3.128	3.793	3.793
8_H2	1.665	1.619	1.685	1.784	1.818	1.850	2.353	2.835	2.835
9_H1	2.881	2.199	1.838	2.344	2.868	3.075	3.266	4.809	4.809
9_H2	3.198	3.835	3.409	1.892	3.250	3.631	3.436	4.649	4.649
10_H1	2.193	2.730	2.725	2.461	3.572	3.556	3.855	5.435	5.435
10_H2	2.362	2.440	2.681	2.913	2.814	2.923	3.750	5.072	5.072
11_H1	1.853	3.116	2.577	1.697	3.552	3.332	2.422	5.365	5.365
11_H2	2.547	4.539	3.594	2.004	4.214	3.747	2.696	5.940	5.940

Min	1.665	1.439	1.187	1.046	1.160	1.459	1.794	2.055	2.055
Max	3.198	4.539	3.594	2.913	4.214	3.747	3.855	5.940	5.940
Mean	2.254	2.275	2.031	1.686	2.352	2.582	2.780	3.828	3.828
σ	0.448	0.803	0.672	0.443	0.810	0.680	0.582	1.176	1.176
Mean-σ	1.806	1.472	1.359	1.244	1.543	1.902	2.198	2.653	2.653
Mean+σ	2.703	3.079	2.703	2.129	3.162	3.261	3.362	5.004	5.004
Q1	1.852	1.641	1.496	1.369	1.719	2.035	2.367	2.799	2.799
Median	2.194	2.041	1.841	1.604	2.180	2.514	2.719	3.623	3.623
Q3	2.556	2.703	2.536	1.840	2.855	3.192	3.232	4.793	4.793

Table A.175 PFA results (Bldg: U4 Group 1 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.353	2.559	1.982	1.503	2.259	3.123	4.096	5.014	5.014
1_H2	2.394	2.123	1.914	1.792	2.032	2.454	2.932	3.505	3.505
2_H1	2.483	2.342	2.070	2.025	2.379	2.570	2.775	3.247	3.247
2_H2	1.936	1.873	1.632	1.481	1.627	2.058	2.392	2.802	2.802
3_H1	2.053	1.927	1.838	1.910	1.980	2.117	2.379	2.672	2.672
3_H2	1.568	1.424	1.292	1.232	1.421	1.551	1.699	2.043	2.043
4_H1	3.916	2.785	3.179	2.690	2.855	3.262	4.427	5.652	5.652
4_H2	4.071	3.658	3.237	2.844	3.114	3.574	4.661	6.610	6.610
5_H1	2.442	2.489	2.497	1.918	2.033	2.335	3.304	3.932	3.932
5_H2	2.170	2.226	2.170	1.696	2.023	2.071	2.929	3.800	3.800
6_H1	1.898	1.627	1.382	1.336	1.685	1.926	2.112	2.532	2.532
6_H2	2.148	2.043	1.912	1.974	2.087	2.151	2.244	2.377	2.377
7_H1	1.746	1.656	1.547	1.374	1.674	1.883	2.054	2.480	2.480
7_H2	2.251	2.167	2.019	1.812	2.057	2.237	2.470	2.745	2.745
8_H1	2.623	2.029	1.520	1.271	1.670	2.222	3.135	3.793	3.793
8_H2	2.046	1.654	1.428	1.326	1.540	1.949	2.335	2.604	2.604
9_H1	2.920	2.521	2.288	2.354	2.535	3.027	4.117	5.293	5.293
9_H2	3.090	2.401	2.472	2.545	3.026	3.390	4.806	6.410	6.410
10_H1	2.685	2.076	1.936	2.025	2.090	2.311	3.154	4.024	4.024
10_H2	5.324	4.573	3.821	2.321	2.749	4.511	5.679	6.587	6.587
11_H1	4.144	3.323	3.150	2.830	2.606	2.955	4.030	4.937	4.937
11_H2	2.149	1.882	1.983	2.278	2.419	2.527	3.022	4.048	4.048

Min	1.568	1.424	1.292	1.232	1.421	1.551	1.699	2.043	2.043
Max	5.324	4.573	3.821	2.844	3.114	4.511	5.679	6.610	6.610
Mean	2.700	2.334	2.149	1.933	2.176	2.555	3.216	3.959	3.959
σ	0.939	0.731	0.672	0.512	0.486	0.695	1.054	1.450	1.450
Mean-σ	1.761	1.603	1.476	1.422	1.689	1.859	2.162	2.510	2.510
Mean+σ	3.640	3.066	2.821	2.445	2.662	3.250	4.270	5.409	5.409
Q1	2.077	1.894	1.683	1.486	1.758	2.083	2.383	2.690	2.690
Median	2.418	2.145	1.983	1.914	2.072	2.323	2.977	3.797	3.797
Q3	3.048	2.513	2.426	2.310	2.506	3.009	4.079	4.994	4.994

Table A.176 PFA results (Bldg: U4 Group 1 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.589	2.277	1.969	1.851	2.234	2.715	3.229	3.892	3.892
1_H2	2.982	2.262	1.721	1.458	2.004	3.037	4.006	4.923	4.923
2_H1	2.286	1.988	1.581	1.494	1.729	2.091	2.634	3.042	3.042
2_H2	2.429	2.209	1.873	1.860	2.172	2.515	2.748	3.278	3.278
3_H1	1.624	1.457	1.258	1.183	1.349	1.580	1.923	2.240	2.240
3_H2	1.953	1.935	1.824	1.916	2.090	2.189	2.285	2.569	2.569
4_H1	4.339	5.774	5.881	2.898	6.432	5.795	5.509	11.970	11.970
4_H2	3.744	5.037	5.375	2.297	4.973	4.838	4.386	8.767	8.767
5_H1	2.198	3.294	3.021	1.796	3.372	3.167	2.949	4.832	4.832
5_H2	2.630	2.963	2.622	1.744	2.577	2.781	3.019	4.456	4.456
6_H1	2.091	1.986	1.786	1.805	1.980	2.150	2.289	2.412	2.412
6_H2	1.757	1.592	1.410	1.250	1.675	1.887	1.984	2.451	2.451
7_H1	2.342	2.218	1.983	1.782	2.033	2.306	2.459	3.012	3.012
7_H2	1.872	1.726	1.506	1.340	1.933	1.925	2.165	2.968	2.968
8_H1	1.848	1.698	1.383	1.341	1.486	1.762	2.050	2.299	2.299
8_H2	2.084	1.664	1.456	1.255	1.557	1.921	2.441	3.249	3.249
9_H1	2.458	3.183	3.170	2.649	3.635	3.486	4.169	6.060	6.060
9_H2	2.582	2.916	2.949	2.283	3.630	3.914	3.654	7.351	7.351
10_H1	5.135	3.967	3.343	2.307	2.718	4.420	5.483	6.731	6.731
10_H2	2.465	2.332	2.003	1.732	2.144	2.396	2.930	3.898	3.898
11_H1	2.093	1.909	1.998	2.063	2.197	2.350	2.987	3.537	3.537
11_H2	3.986	3.025	2.859	2.679	2.637	3.154	4.315	5.024	5.024

Min	1.624	1.457	1.258	1.183	1.349	1.580	1.923	2.240	2.240
Max	5.135	5.774	5.881	2.898	6.432	5.795	5.509	11.970	11.970
Mean	2.613	2.610	2.408	1.863	2.571	2.835	3.164	4.498	4.498
σ	0.904	1.116	1.219	0.491	1.215	1.084	1.069	2.428	2.428
Mean-σ	1.709	1.494	1.189	1.372	1.356	1.751	2.095	2.071	2.071
Mean+σ	3.518	3.726	3.627	2.354	3.786	3.920	4.233	6.926	6.926
Q1	2.086	1.916	1.616	1.467	1.944	2.105	2.327	2.979	2.979
Median	2.385	2.240	1.976	1.800	2.158	2.456	2.940	3.715	3.715
Q3	2.620	3.010	2.927	2.228	2.698	3.164	3.918	4.999	4.999

Table A.177 PFA results (Bldg: U4 Group 5 – Site Class: A – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	1.842	1.598	1.774	1.550	1.727	1.776	2.060	2.551	2.551
1_H2	2.138	1.750	2.016	1.861	1.508	1.729	2.475	3.077	3.077
2_H1	1.306	1.223	1.378	1.357	1.245	1.182	1.608	2.150	2.150
2_H2	1.672	1.837	1.807	1.577	1.574	1.606	1.827	2.408	2.408
3_H1	1.848	1.520	1.415	1.104	1.446	1.823	2.452	2.952	2.952
3_H2	1.630	1.380	1.487	1.356	1.509	1.654	2.088	2.565	2.565
4_H1	1.606	1.263	1.155	1.030	1.351	1.603	1.937	2.334	2.334
4_H2	1.543	1.276	1.053	1.021	1.186	1.541	1.952	2.245	2.245
5_H1	1.609	1.453	1.239	1.066	1.301	1.518	1.757	2.131	2.131
5_H2	0.832	0.884	0.842	0.759	0.814	0.994	1.034	1.197	1.197
6_H1	1.795	1.646	1.659	1.384	1.459	1.776	2.123	2.556	2.556
6_H2	2.593	2.096	2.096	1.877	2.057	2.530	3.571	4.680	4.680
7_H1	2.150	1.988	1.833	1.512	1.497	1.881	2.390	3.211	3.211
7_H2	2.572	2.455	2.119	1.372	1.583	2.052	3.007	3.766	3.766
8_H1	4.227	3.915	3.652	2.060	2.102	3.005	3.857	5.286	5.286
8_H2	3.130	2.726	2.368	1.973	2.341	3.036	4.271	5.489	5.489
9_H1	2.226	1.846	1.326	1.105	1.653	2.233	2.825	3.311	3.311
9_H2	1.507	1.215	1.047	0.944	1.240	1.463	1.796	2.095	2.095
10_H1	1.643	1.371	1.162	1.120	1.229	1.489	1.753	2.129	2.129
10_H2	1.322	1.215	1.056	0.887	1.022	1.214	1.461	1.635	1.635
11_H1	1.713	1.417	1.217	1.250	1.376	1.572	2.068	2.479	2.479
11_H2	1.493	1.157	1.069	1.046	1.242	1.456	1.700	2.028	2.028

Min	0.832	0.884	0.842	0.759	0.814	0.994	1.034	1.197	1.197
Max	4.227	3.915	3.652	2.060	2.341	3.036	4.271	5.489	5.489
Mean	1.927	1.692	1.580	1.328	1.476	1.779	2.273	2.831	2.831
σ	0.716	0.663	0.625	0.367	0.352	0.524	0.799	1.106	1.106
Mean-σ	1.211	1.029	0.955	0.960	1.123	1.255	1.474	1.725	1.725
Mean+σ	2.643	2.356	2.206	1.695	1.828	2.303	3.072	3.937	3.937
Q1	1.559	1.266	1.157	1.051	1.243	1.497	1.767	2.135	2.135
Median	1.692	1.486	1.396	1.303	1.452	1.630	2.064	2.515	2.515
Q3	2.147	1.844	1.826	1.540	1.581	1.867	2.469	3.177	3.177

Table A.178 PFA results (Bldg: U4 Group 5 – Site Class: A – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.727	2.175	2.065	1.515	1.413	1.885	2.868	3.650	3.650
1_H2	1.844	1.716	1.609	1.370	1.536	1.846	2.328	2.859	2.859
2_H1	1.944	2.025	1.654	1.339	1.423	1.499	1.856	2.360	2.360
2_H2	1.386	1.162	1.218	1.296	1.180	1.217	1.616	2.057	2.057
3_H1	1.764	1.519	1.461	1.307	1.610	1.734	2.198	2.642	2.642
3_H2	1.737	1.425	1.204	1.105	1.623	2.010	2.412	2.805	2.805
4_H1	1.455	1.187	1.073	1.013	1.259	1.523	1.823	2.091	2.091
4_H2	1.390	1.182	1.089	1.006	1.238	1.430	1.746	2.129	2.129
5_H1	0.803	0.765	0.724	0.686	0.814	0.853	0.914	1.023	1.023
5_H2	1.670	1.350	1.148	1.037	1.277	1.591	1.862	2.169	2.169
6_H1	2.368	2.016	1.705	1.707	1.894	2.123	3.297	4.324	4.324
6_H2	2.154	1.663	1.554	1.392	1.485	1.867	2.575	3.305	3.305
7_H1	2.592	2.495	2.034	1.247	1.737	2.344	3.218	3.943	3.943
7_H2	2.036	2.018	1.833	1.474	1.526	1.851	2.467	3.169	3.169
8_H1	2.886	2.333	1.977	1.915	2.147	2.550	3.821	4.999	4.999
8_H2	4.413	4.022	3.656	2.135	2.271	2.977	4.330	5.769	5.769
9_H1	1.373	1.162	1.016	0.971	1.150	1.429	1.640	1.849	1.849
9_H2	1.745	1.445	1.215	1.062	1.566	1.874	2.214	2.567	2.567
10_H1	1.292	1.134	0.922	0.834	1.014	1.232	1.384	1.497	1.497
10_H2	1.589	1.288	1.189	1.130	1.281	1.465	1.741	2.058	2.058
11_H1	1.438	1.208	1.060	1.024	1.223	1.437	1.677	1.955	1.955
11_H2	1.679	1.349	1.256	1.181	1.307	1.533	1.955	2.327	2.327

Min	0.803	0.765	0.724	0.686	0.814	0.853	0.914	1.023	1.023
Max	4.413	4.022	3.656	2.135	2.271	2.977	4.330	5.769	5.769
Mean	1.922	1.665	1.485	1.261	1.453	1.740	2.270	2.798	2.798
σ	0.750	0.692	0.614	0.342	0.345	0.473	0.820	1.151	1.151
Mean-σ	1.172	0.973	0.871	0.919	1.109	1.266	1.450	1.647	1.647
Mean+σ	2.672	2.358	2.099	1.603	1.798	2.213	3.090	3.949	3.949
Q1	1.442	1.192	1.104	1.028	1.243	1.444	1.742	2.066	2.066
Median	1.741	1.435	1.237	1.214	1.418	1.662	2.076	2.463	2.463
Q3	2.125	2.018	1.693	1.386	1.599	1.882	2.548	3.271	3.271

Table A.179 PFA results (Bldg: U4 Group 5 – Site Class: C – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	2.089	1.779	1.707	1.657	1.760	2.020	2.351	3.025	3.025
1_H2	2.204	1.957	1.761	1.705	1.678	2.001	2.378	2.997	2.997
2_H1	3.279	2.513	1.786	1.432	2.103	2.417	3.318	4.201	4.201
2_H2	2.314	2.445	2.366	1.774	2.349	2.652	2.615	3.544	3.544
3_H1	3.075	2.611	2.261	1.803	2.012	2.434	3.460	4.312	4.312
3_H2	3.246	2.870	2.359	1.986	2.472	3.236	3.634	4.456	4.456
4_H1	2.457	2.088	1.557	1.380	1.763	2.445	2.893	3.295	3.295
4_H2	2.091	1.922	1.756	1.592	1.829	2.095	2.243	2.951	2.951
5_H1	2.094	1.804	1.388	1.411	1.590	2.080	2.477	2.765	2.765
5_H2	1.680	1.476	1.489	1.321	1.528	1.651	2.014	2.376	2.376
6_H1	2.000	1.614	1.557	1.510	1.644	1.955	2.564	3.179	3.179
6_H2	2.386	2.124	1.847	1.751	2.163	2.359	2.942	3.526	3.526
7_H1	1.802	1.530	1.257	1.077	1.250	1.660	2.050	2.397	2.397
7_H2	1.683	1.550	1.494	1.318	1.558	1.706	2.175	2.585	2.585
8_H1	1.633	1.709	1.822	1.915	2.001	1.815	2.371	3.104	3.104
8_H2	2.179	1.782	1.594	1.394	1.703	2.385	3.271	3.890	3.890
9_H1	2.989	3.324	3.157	2.102	2.835	3.076	3.214	3.919	3.919
9_H2	3.314	2.829	2.445	2.275	2.838	3.343	4.007	4.859	4.859
10_H1	3.310	3.099	2.963	3.210	2.873	3.094	4.250	6.089	6.089
10_H2	2.757	2.516	2.371	2.547	2.961	3.553	4.449	6.564	6.564
11_H1	2.565	2.824	2.369	1.923	2.495	2.828	3.209	4.727	4.727
11_H2	2.457	2.315	1.887	1.508	2.558	2.302	2.490	3.266	3.266

Min	1.633	1.476	1.257	1.077	1.250	1.651	2.014	2.376	2.376
Max	3.314	3.324	3.157	3.210	2.961	3.553	4.449	6.564	6.564
Mean	2.437	2.213	1.963	1.754	2.089	2.414	2.926	3.729	3.729
σ	0.561	0.551	0.505	0.475	0.510	0.567	0.712	1.106	1.106
Mean-σ	1.876	1.661	1.458	1.279	1.579	1.847	2.214	2.623	2.623
Mean+σ	2.997	2.764	2.468	2.229	2.599	2.981	3.638	4.834	4.834
Q1	2.089	1.780	1.566	1.417	1.684	2.006	2.373	3.004	3.004
Median	2.350	2.106	1.804	1.681	2.007	2.372	2.754	3.411	3.411
Q3	2.931	2.587	2.364	1.921	2.489	2.784	3.306	4.284	4.284

Table A.180 PFA results (Bldg: U4 Group 5 – Site Class: C – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.464	2.102	1.689	1.622	1.607	2.148	2.865	3.483	3.483
1_H2	2.228	1.770	1.702	1.541	1.903	2.084	2.629	3.255	3.255
2_H1	2.475	2.568	2.476	1.835	2.215	2.704	2.814	3.766	3.766
2_H2	2.779	2.212	1.863	1.506	2.008	2.323	2.936	3.612	3.612
3_H1	2.926	2.528	1.970	1.750	2.171	2.718	3.581	4.582	4.582
3_H2	2.817	2.326	2.013	1.619	1.795	2.376	3.424	4.125	4.125
4_H1	2.227	1.928	1.693	1.544	1.841	2.154	2.470	2.972	2.972
4_H2	1.943	1.706	1.415	1.333	1.639	2.010	2.252	2.500	2.500
5_H1	1.762	1.624	1.529	1.291	1.643	1.883	2.263	2.725	2.725
5_H2	1.839	1.587	1.283	1.328	1.584	1.977	2.271	2.500	2.500
6_H1	2.321	2.027	1.841	1.857	2.192	2.407	2.821	3.285	3.285
6_H2	1.909	1.675	1.464	1.395	1.609	2.147	2.512	2.878	2.878
7_H1	1.719	1.674	1.467	1.208	1.600	1.847	2.132	2.522	2.522
7_H2	1.801	1.441	1.215	1.049	1.211	1.453	1.876	2.131	2.131
8_H1	2.200	1.663	1.536	1.357	1.714	2.404	3.218	3.819	3.819
8_H2	1.724	1.456	1.797	1.785	1.691	1.837	2.343	2.877	2.877
9_H1	2.849	2.388	1.958	2.277	2.521	2.827	3.398	4.235	4.235
9_H2	3.243	3.490	3.196	1.880	2.961	3.406	3.521	4.163	4.163
10_H1	2.216	2.096	2.464	2.467	2.602	2.776	3.917	5.415	5.415
10_H2	2.426	2.910	2.857	2.927	2.662	2.912	3.803	5.124	5.124
11_H1	1.873	1.828	1.800	1.523	1.672	1.826	2.481	3.248	3.248
11_H2	2.243	2.713	2.139	1.771	2.142	2.393	2.909	3.924	3.924

Min	1.719	1.441	1.215	1.049	1.211	1.453	1.876	2.131	2.131
Max	3.243	3.490	3.196	2.927	2.961	3.406	3.917	5.415	5.415
Mean	2.272	2.078	1.880	1.676	1.954	2.301	2.838	3.506	3.506
σ	0.439	0.524	0.498	0.434	0.434	0.453	0.578	0.869	0.869
Mean-σ	1.833	1.554	1.383	1.242	1.519	1.847	2.260	2.637	2.637
Mean+σ	2.711	2.602	2.378	2.110	2.388	2.754	3.416	4.376	4.376
Q1	1.882	1.674	1.531	1.366	1.640	1.985	2.375	2.878	2.878
Median	2.227	1.978	1.798	1.581	1.818	2.239	2.817	3.384	3.384
Q3	2.472	2.373	2.002	1.823	2.187	2.629	3.353	4.075	4.075

Table A.181 PFA results (Bldg: U4 Group 5 – Site Class: D – Dir: X)

X	1	2	3	4	5	6	7	8	MFA
1_H1	3.330	2.704	1.972	1.529	2.321	3.166	4.093	4.948	4.948
1_H2	2.391	2.117	1.923	1.842	2.099	2.635	2.906	3.489	3.489
2_H1	2.434	2.345	2.117	1.995	2.372	2.570	2.724	3.220	3.220
2_H2	1.930	1.832	1.653	1.464	1.649	2.009	2.288	2.773	2.773
3_H1	2.083	1.994	1.843	1.934	2.021	2.187	2.442	2.725	2.725
3_H2	1.685	1.435	1.302	1.236	1.428	1.538	1.813	2.052	2.052
4_H1	3.710	4.318	3.640	2.917	3.980	5.185	5.342	6.764	6.764
4_H2	4.474	4.100	4.022	2.860	4.138	4.214	4.461	6.955	6.955
5_H1	2.552	2.779	2.682	1.866	2.182	2.819	3.529	4.148	4.148
5_H2	2.221	2.781	2.679	1.751	2.170	2.521	2.863	3.898	3.898
6_H1	1.906	1.703	1.460	1.347	1.666	1.967	2.113	2.577	2.577
6_H2	2.266	2.162	1.976	1.875	2.064	2.249	2.414	2.527	2.527
7_H1	1.741	1.680	1.542	1.365	1.658	1.848	2.057	2.454	2.454
7_H2	2.298	2.167	2.033	1.818	2.020	2.284	2.513	2.742	2.742
8_H1	2.703	2.111	1.534	1.275	1.720	2.340	3.232	3.889	3.889
8_H2	2.055	1.738	1.495	1.314	1.617	2.005	2.316	2.555	2.555
9_H1	2.906	2.746	2.243	2.341	3.765	3.712	4.705	5.958	5.958
9_H2	3.215	2.498	2.806	2.556	3.273	3.607	4.919	6.883	6.883
10_H1	2.674	2.117	1.975	1.984	2.206	2.338	3.207	4.050	4.050
10_H2	5.405	4.680	3.776	2.273	2.772	4.619	5.596	6.493	6.493
11_H1	4.121	3.372	3.150	2.802	2.642	3.093	4.026	4.991	4.991
11_H2	2.199	1.883	1.965	2.275	2.394	2.501	3.096	4.244	4.244

Min	1.685	1.435	1.302	1.236	1.428	1.538	1.813	2.052	2.052
Max	5.405	4.680	4.022	2.917	4.138	5.185	5.596	6.955	6.955
Mean	2.741	2.512	2.263	1.937	2.371	2.791	3.302	4.106	4.106
σ	0.955	0.885	0.787	0.525	0.776	0.945	1.126	1.611	1.611
Mean-σ	1.786	1.627	1.476	1.412	1.595	1.846	2.176	2.495	2.495
Mean+σ	3.696	3.396	3.050	2.462	3.146	3.737	4.428	5.717	5.717
Q1	2.112	1.910	1.701	1.480	1.795	2.203	2.421	2.729	2.729
Median	2.413	2.165	1.976	1.871	2.176	2.511	3.001	3.893	3.893
Q3	3.137	2.771	2.681	2.275	2.580	3.148	4.076	4.980	4.980

Table A.182 PFA results (Bldg: U4 Group 5 – Site Class: D – Dir: Y)

Y	1	2	3	4	5	6	7	8	MFA
1_H1	2.585	2.189	1.935	1.865	2.170	2.716	3.263	4.019	4.019
1_H2	3.045	2.365	1.745	1.420	2.094	2.986	4.041	4.923	4.923
2_H1	2.271	2.026	1.643	1.480	1.774	2.110	2.632	2.982	2.982
2_H2	2.450	2.162	1.883	1.897	2.261	2.573	2.806	3.271	3.271
3_H1	1.713	1.550	1.350	1.193	1.420	1.635	1.926	2.263	2.263
3_H2	1.961	1.874	1.773	1.903	1.987	2.093	2.298	2.451	2.451
4_H1	4.130	3.463	3.206	2.628	3.093	3.716	4.804	6.589	6.589
4_H2	3.646	3.477	3.711	2.601	3.054	3.826	4.704	6.403	6.403
5_H1	2.145	2.293	2.156	1.665	1.897	2.042	2.720	3.540	3.540
5_H2	2.573	2.634	2.467	1.685	2.114	2.433	2.984	3.744	3.744
6_H1	2.125	1.973	1.801	1.843	2.031	2.199	2.333	2.424	2.424
6_H2	1.788	1.479	1.203	1.253	1.497	1.794	2.042	2.502	2.502
7_H1	2.391	2.188	1.960	1.827	2.080	2.314	2.515	2.767	2.767
7_H2	1.862	1.671	1.473	1.352	1.687	1.914	2.133	2.594	2.594
8_H1	1.869	1.580	1.336	1.343	1.486	1.775	2.099	2.328	2.328
8_H2	2.096	1.693	1.366	1.246	1.531	1.959	2.449	3.033	3.033
9_H1	2.474	2.093	2.392	2.642	3.173	3.166	4.247	5.797	5.797
9_H2	2.586	2.231	2.363	2.298	2.604	2.909	3.674	4.984	4.984
10_H1	5.210	4.099	3.396	2.306	2.892	4.493	5.489	6.631	6.631
10_H2	2.535	2.104	1.923	1.757	1.910	2.337	2.985	3.728	3.728
11_H1	2.276	2.118	2.010	2.122	2.277	2.267	2.872	3.516	3.516
11_H2	3.997	3.048	2.808	2.702	2.573	3.229	4.342	4.996	4.996

Min	1.713	1.479	1.203	1.193	1.420	1.635	1.926	2.263	2.263
Max	5.210	4.099	3.711	2.702	3.173	4.493	5.489	6.631	6.631
Mean	2.624	2.287	2.086	1.865	2.164	2.568	3.153	3.886	3.886
σ	0.881	0.679	0.684	0.491	0.536	0.746	1.028	1.459	1.459
Mean-σ	1.743	1.608	1.402	1.374	1.628	1.822	2.125	2.427	2.427
Mean+σ	3.505	2.966	2.771	2.356	2.699	3.314	4.181	5.344	5.344
Q1	2.103	1.899	1.669	1.435	1.804	2.055	2.362	2.637	2.637
Median	2.420	2.140	1.929	1.835	2.087	2.326	2.839	3.528	3.528
Q3	2.586	2.347	2.385	2.254	2.499	2.967	3.950	4.969	4.969

B. Charts for Results

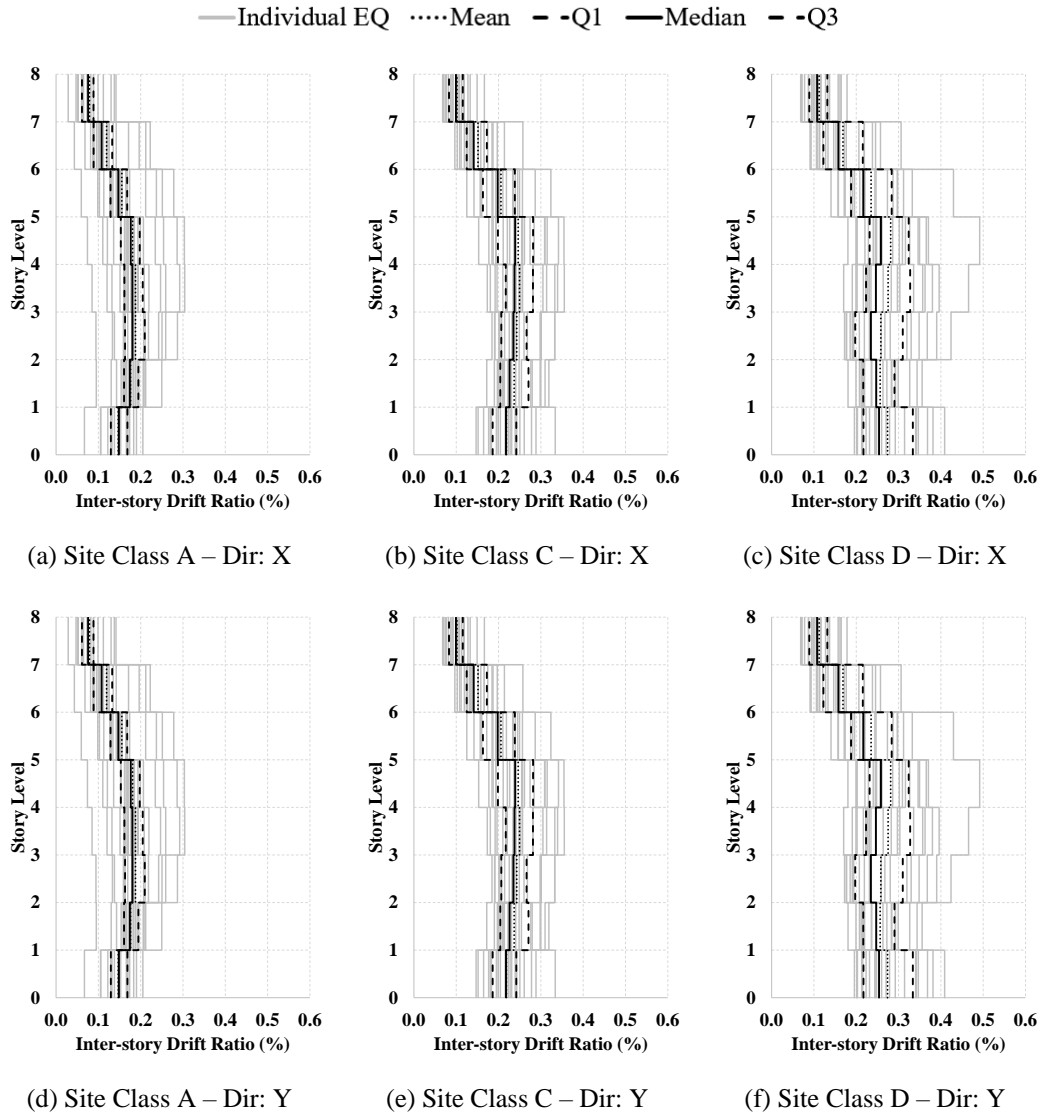
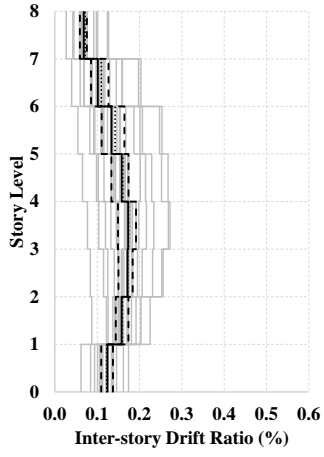
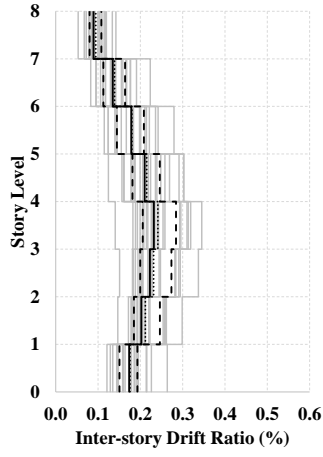


Figure A.1. IDR profiles for building case “Symmetric”

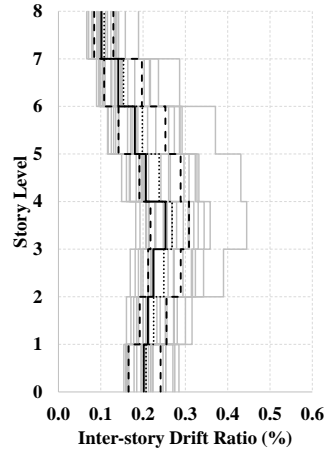
— Individual EQ ···· Mean - - Q1 — Median - - Q3



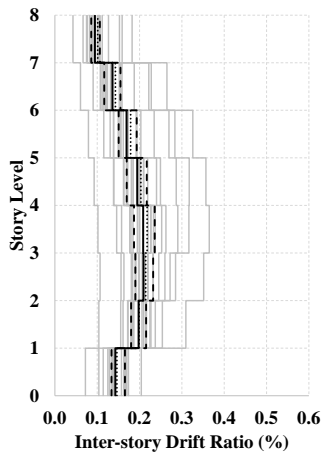
(a) Site Class A – Dir: X



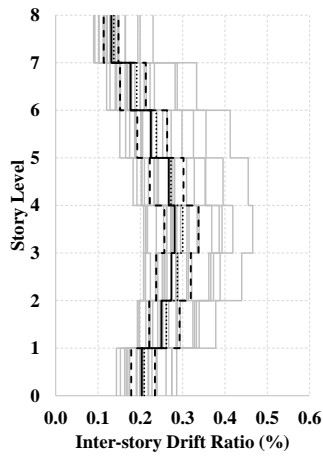
(b) Site Class C – Dir: X



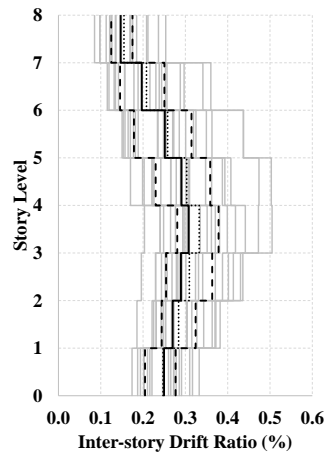
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.2. IDR profiles for building case “T1”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

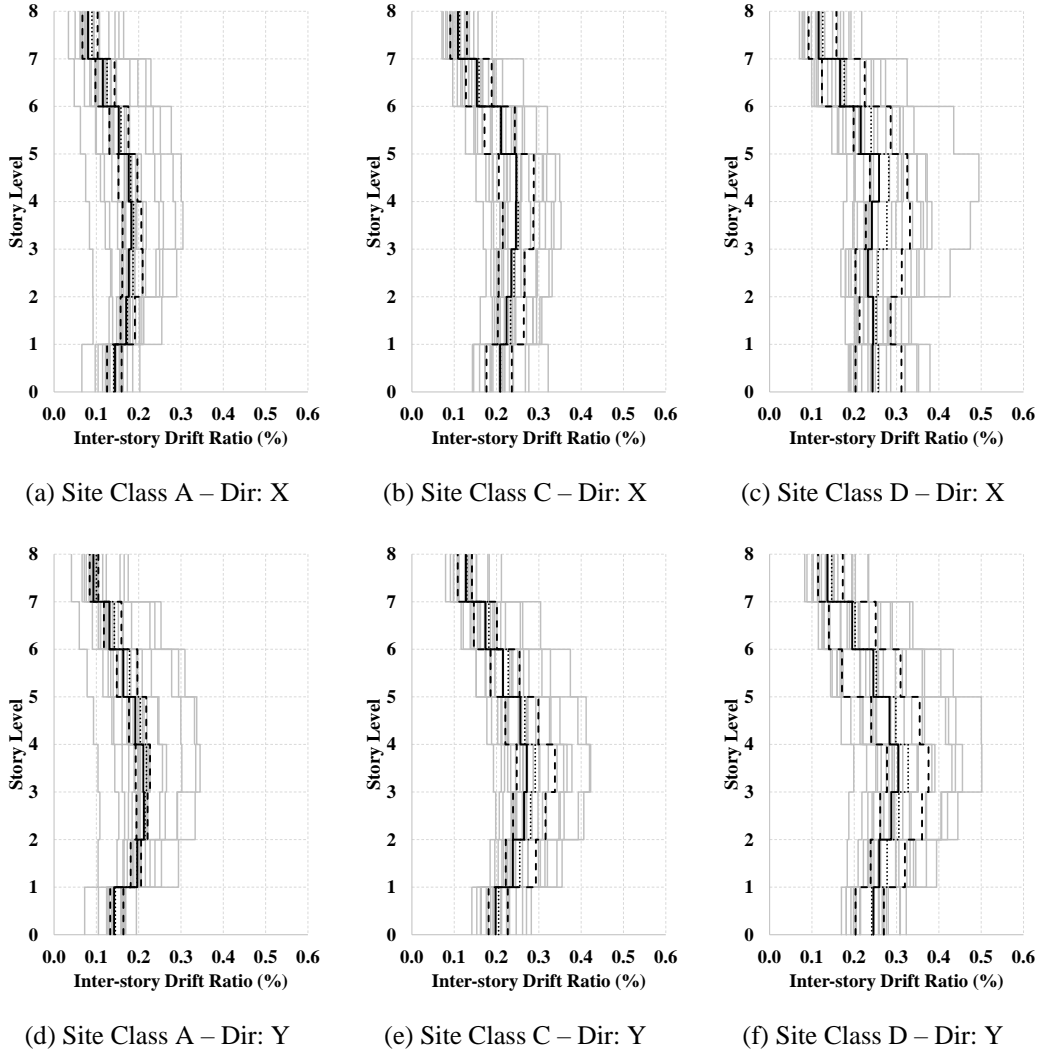
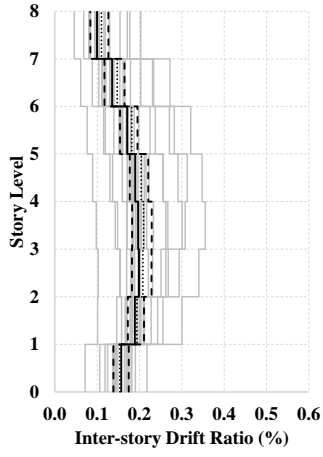
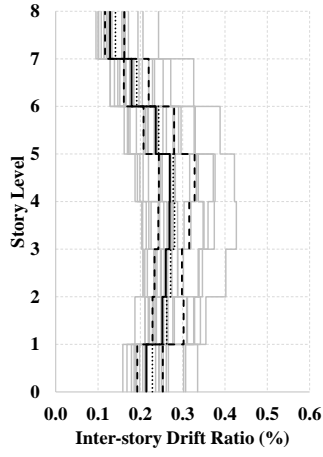


Figure A.3. IDR profiles for building case “T2”

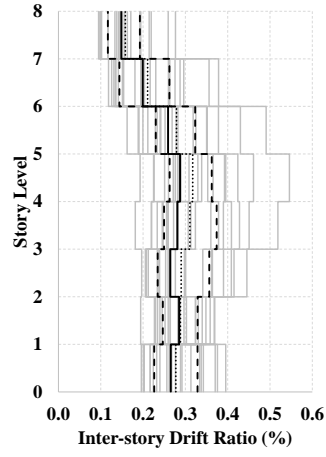
— Individual EQ Mean - -Q1 — Median - -Q3



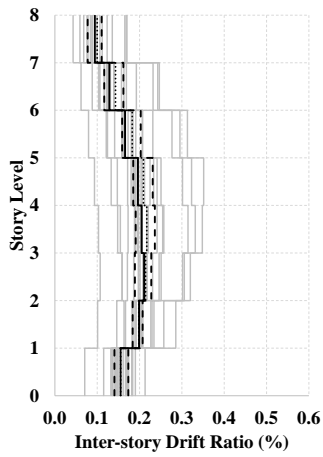
(a) Site Class A – Dir: X



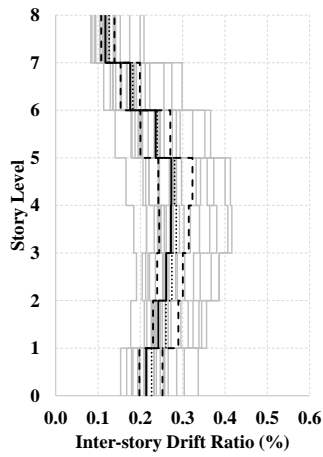
(b) Site Class C – Dir: X



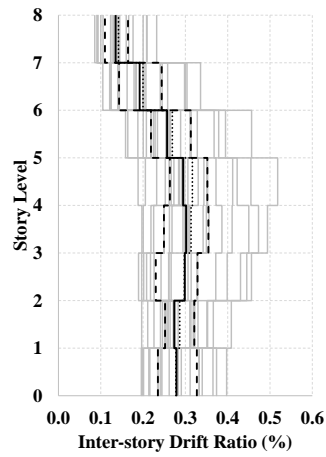
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.4. IDR profiles for building case “T3”

— Individual EQ ····· Mean - -Q1 — Median - -Q3

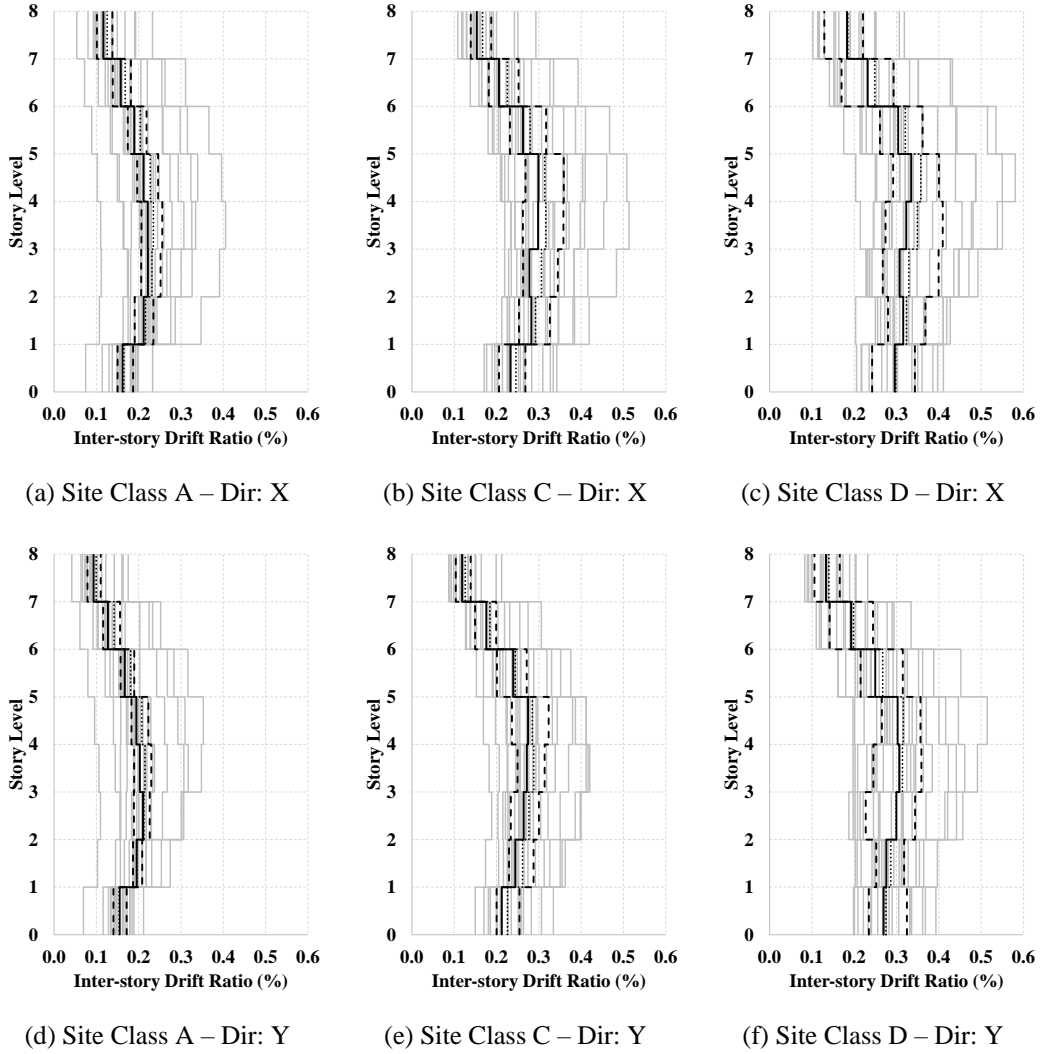
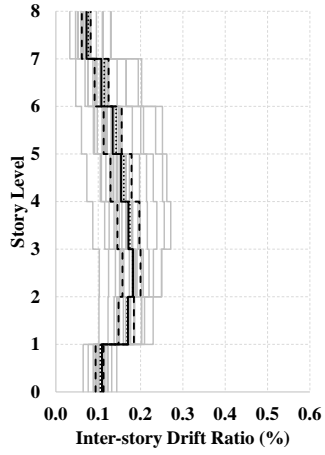
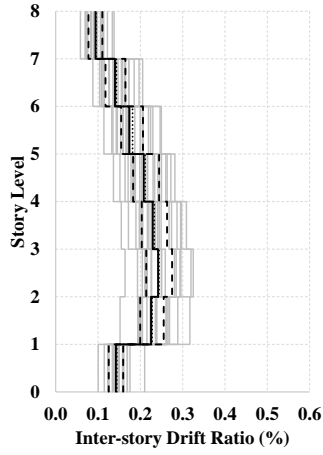


Figure A.5. IDR profiles for building case “T4”

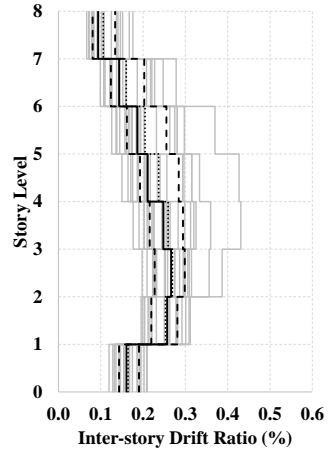
— Individual EQ Mean - - Q1 — Median - - Q3



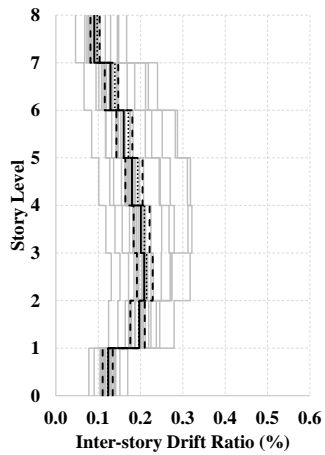
(a) Site Class A – Dir: X



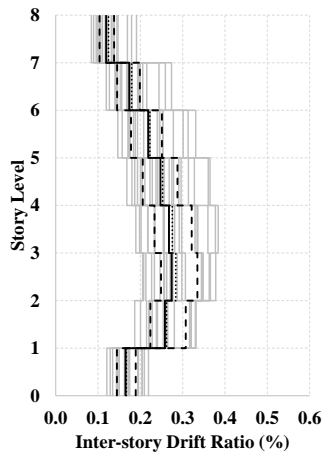
(b) Site Class C – Dir: X



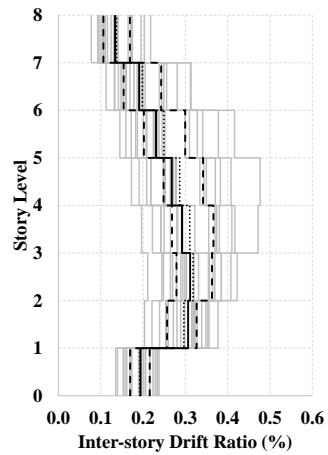
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.6. IDR profiles for building case “U1”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

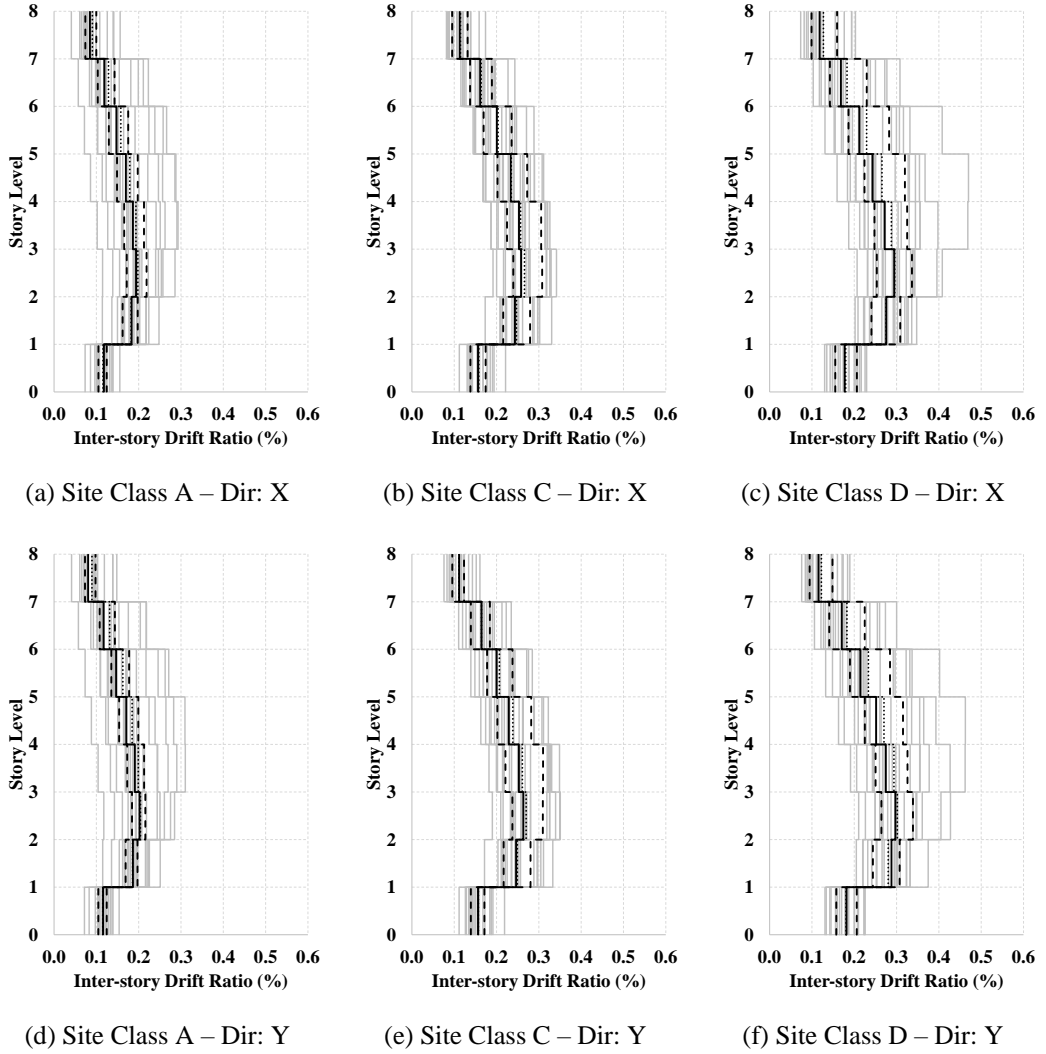
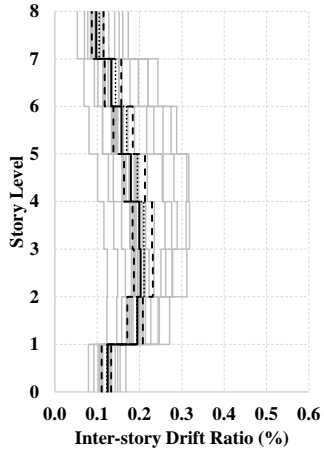
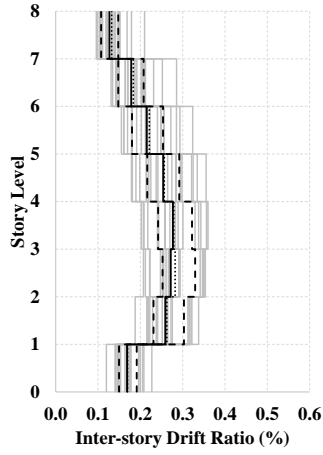


Figure A.7. IDR profiles for building case “U2”

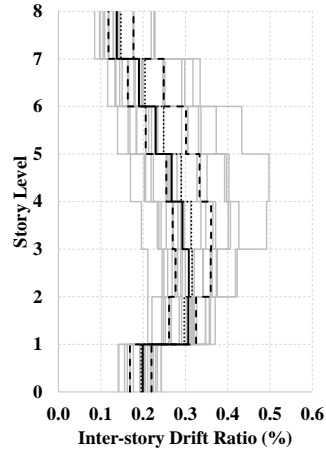
— Individual EQ ···· Mean - - Q1 — Median - - Q3



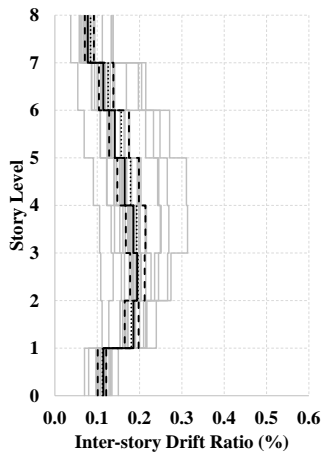
(a) Site Class A – Dir: X



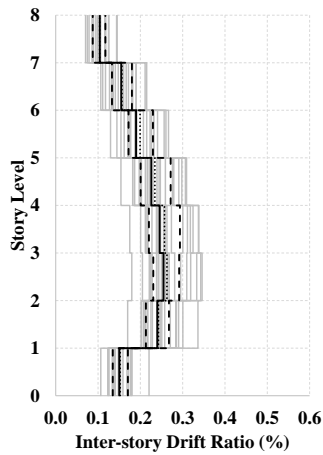
(b) Site Class C – Dir: X



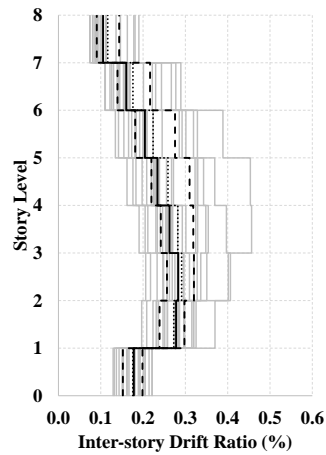
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.8. IDR profiles for building case “U3”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

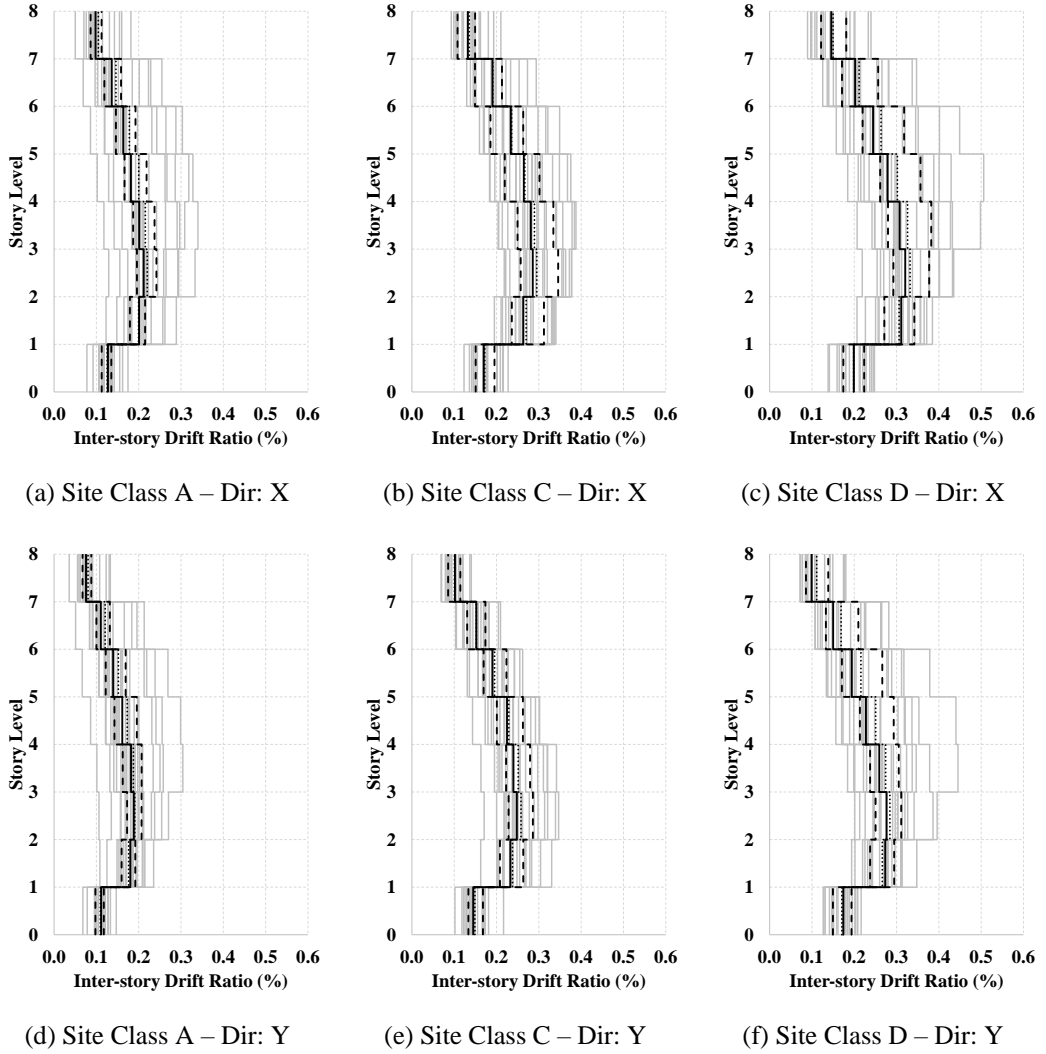
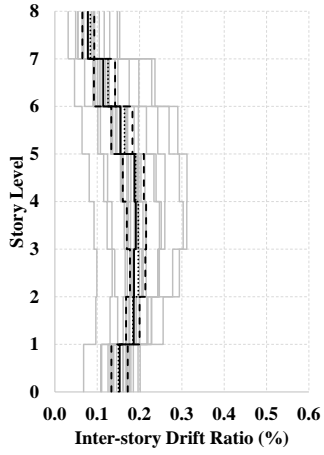
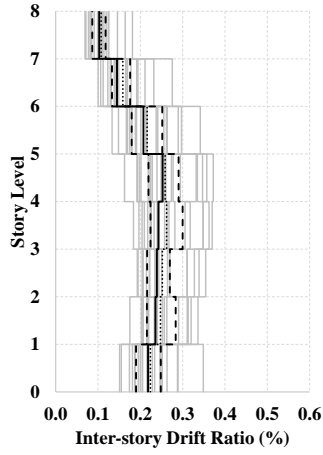


Figure A.9. IDR profiles for building case “U4”

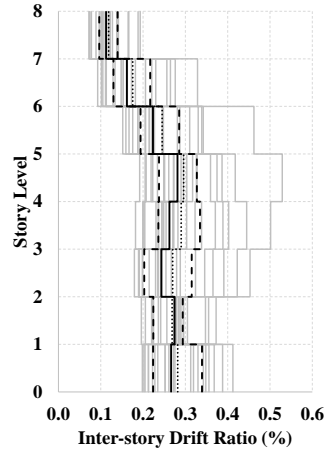
— Individual EQ ···· Mean - - Q1 — Median - - Q3



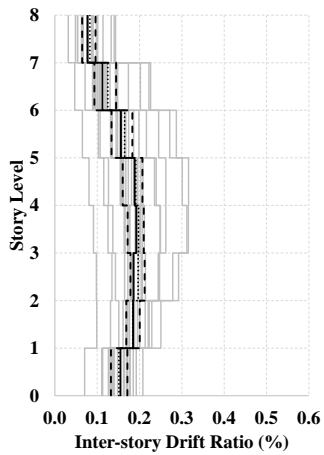
(a) Site Class A – Dir: X



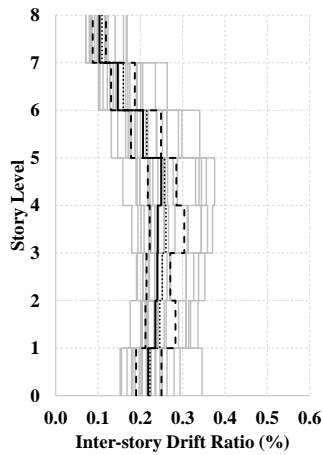
(b) Site Class C – Dir: X



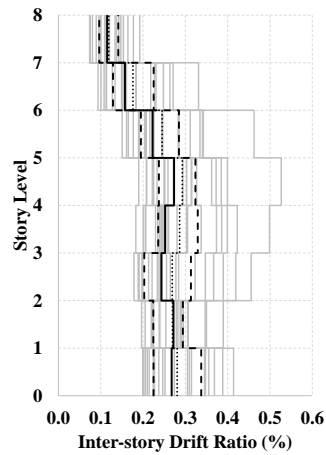
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.10. IDR profiles for building case “Symmetric Mass”

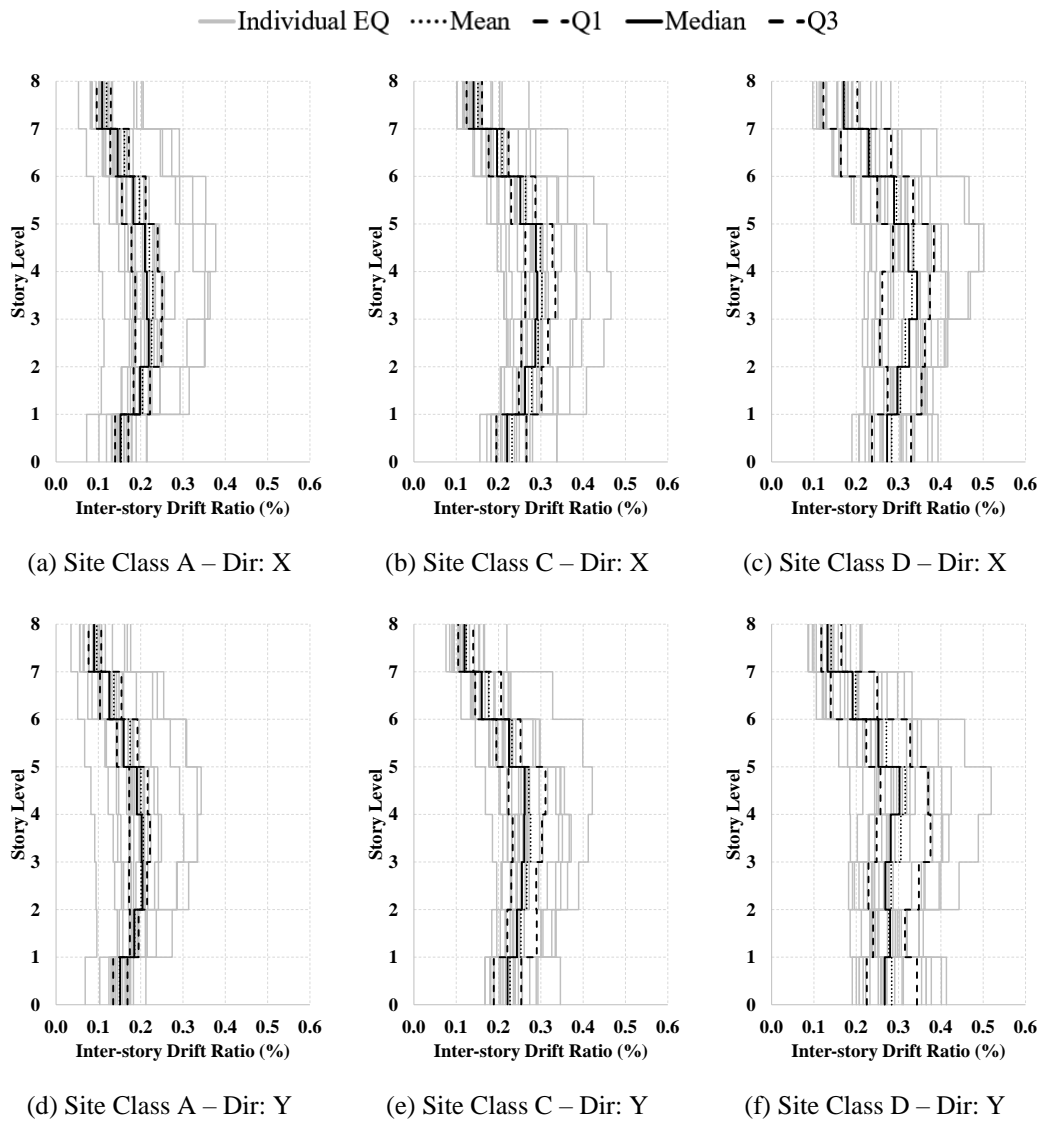
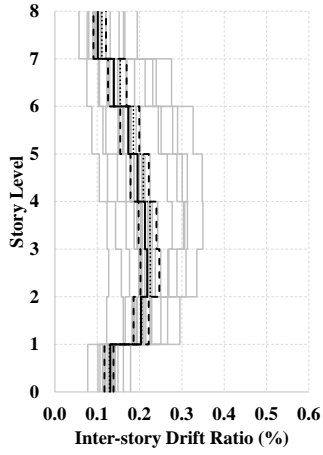
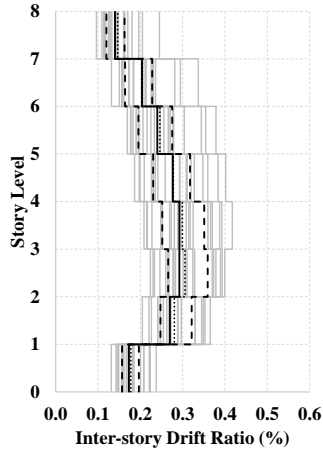


Figure A.11. IDR profiles for building case “T4 Mass”

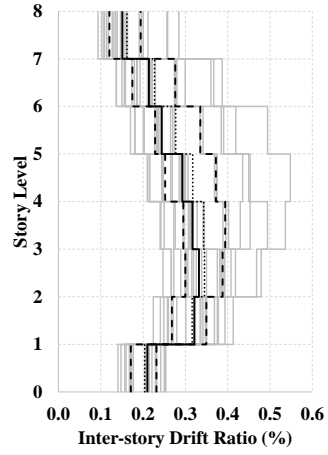
— Individual EQ ···· Mean - - Q1 — Median - - Q3



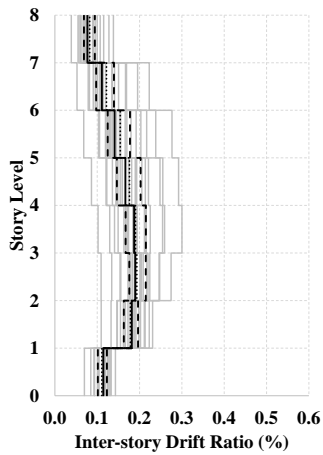
(a) Site Class A – Dir: X



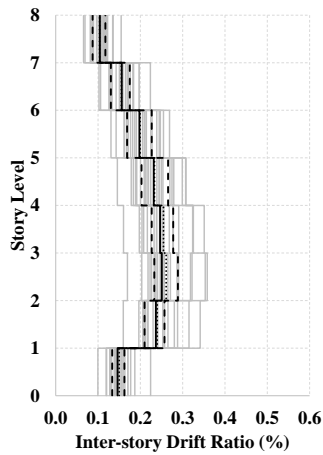
(b) Site Class C – Dir: X



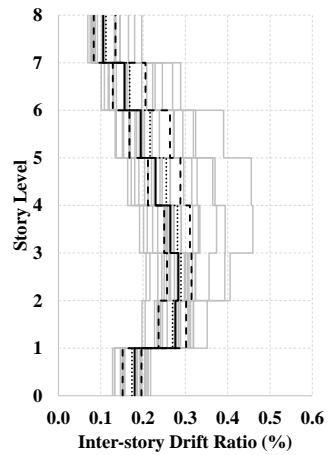
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



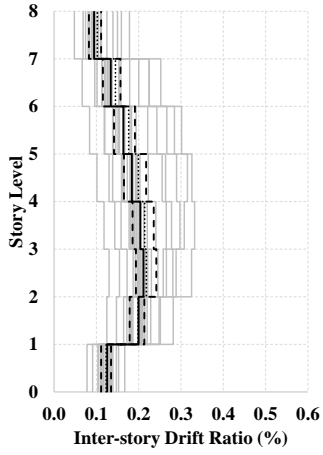
(e) Site Class C – Dir: Y



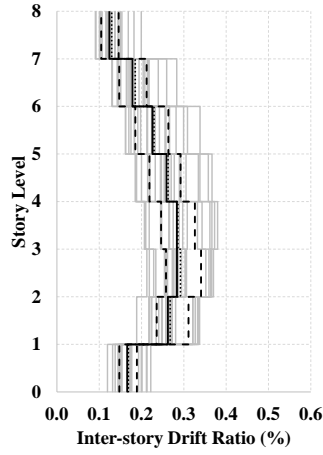
(f) Site Class D – Dir: Y

Figure A.12. IDR profiles for building case “U4 Mass”

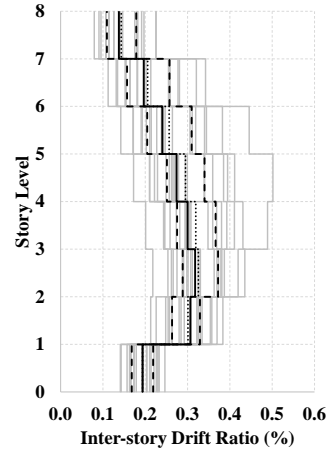
— Individual EQ ···· Mean - -Q1 — Median - -Q3



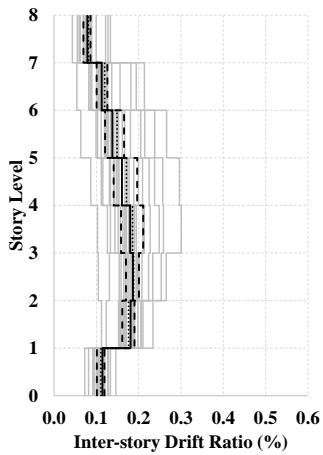
(a) Site Class A – Dir: X



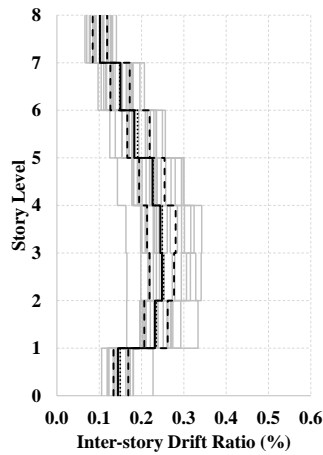
(b) Site Class C – Dir: X



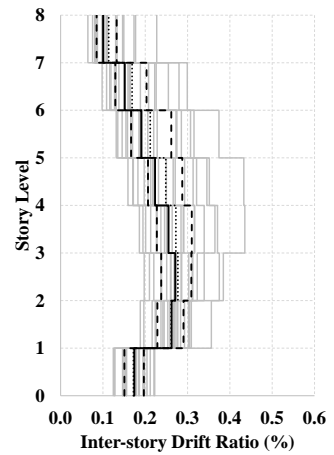
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



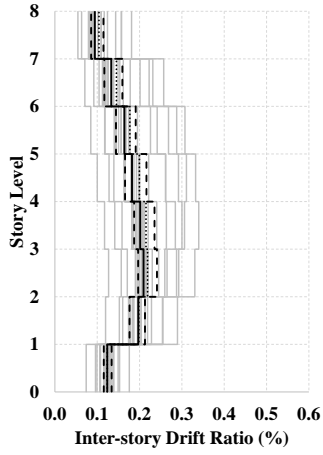
(e) Site Class C – Dir: Y



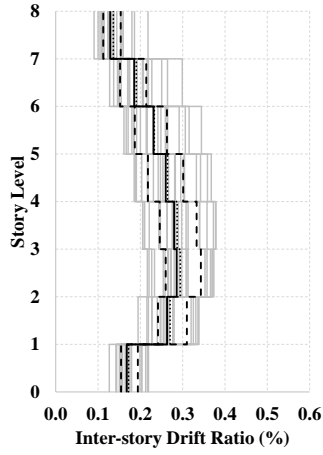
(f) Site Class D – Dir: Y

Figure A.13. IDR profiles for building case “U4 Group 1”

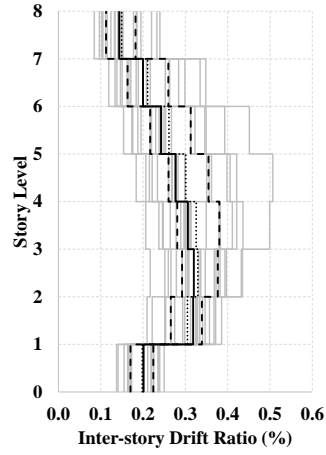
— Individual EQ ···· Mean - - Q1 — Median - - Q3



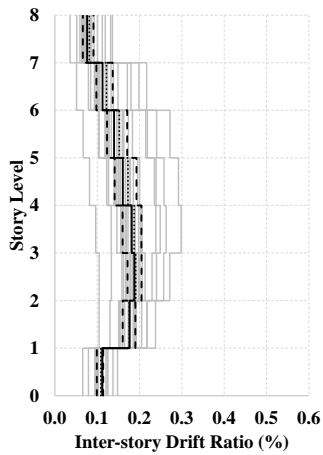
(a) Site Class A – Dir: X



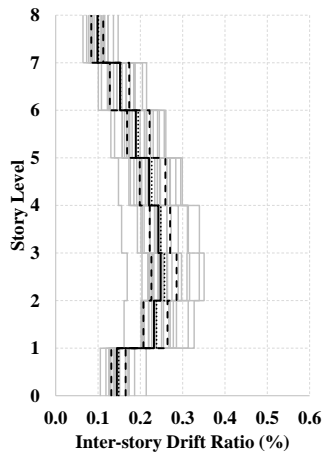
(b) Site Class C – Dir: X



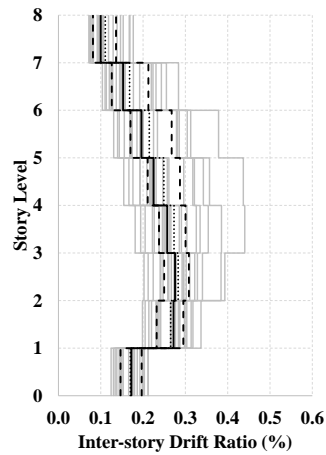
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.14. IDR profiles for building case “U4 Group 5”

— Individual EQ Mean - -Q1 — Median - -Q3

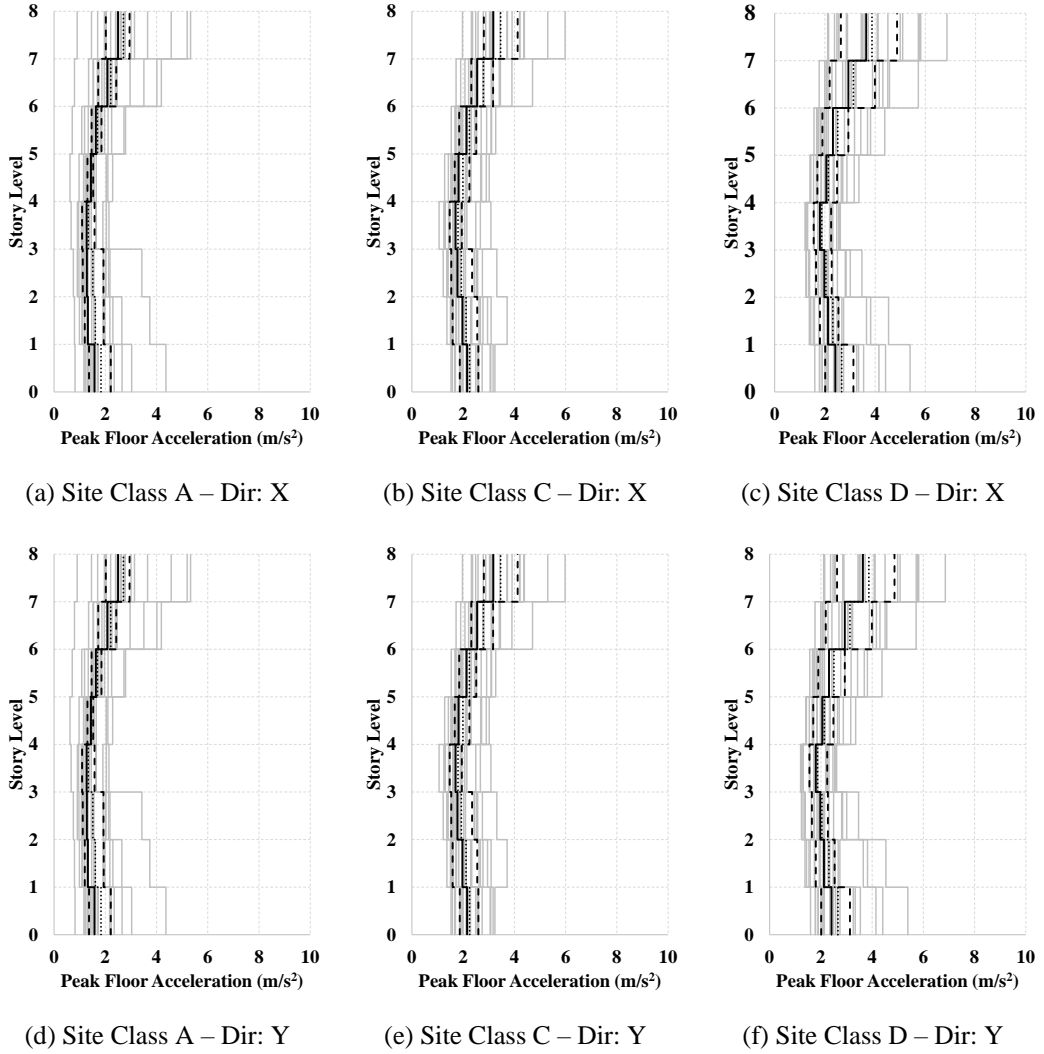
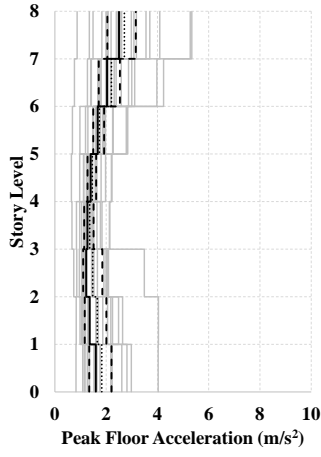
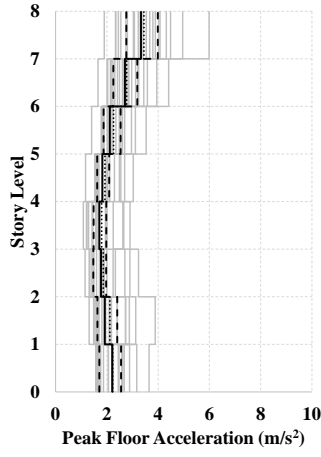


Figure A.15. PFA profiles for building case “Symmetric”

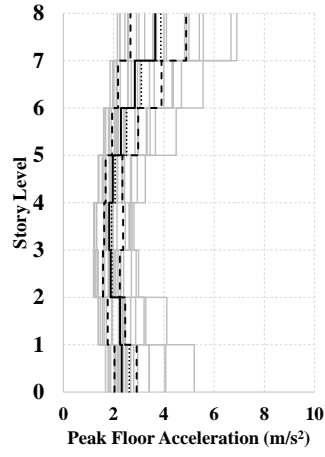
— Individual EQ Mean - - Q1 — Median - - Q3



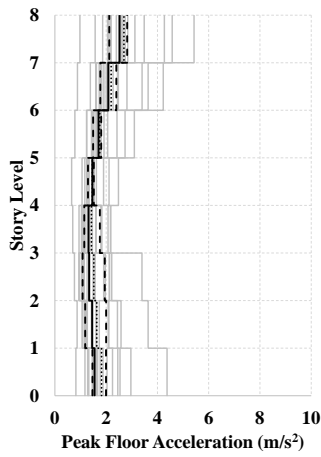
(a) Site Class A – Dir: X



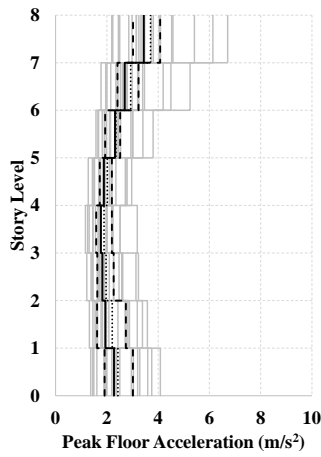
(b) Site Class C – Dir: X



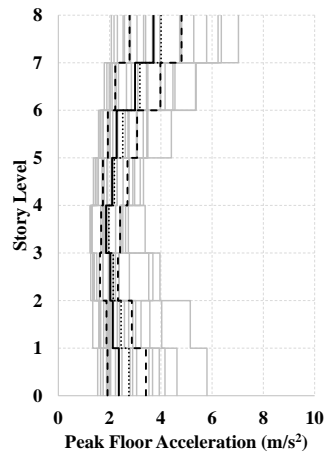
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.16. PFA profiles for building case “T1”

— Individual EQ Mean - -Q1 — Median - -Q3

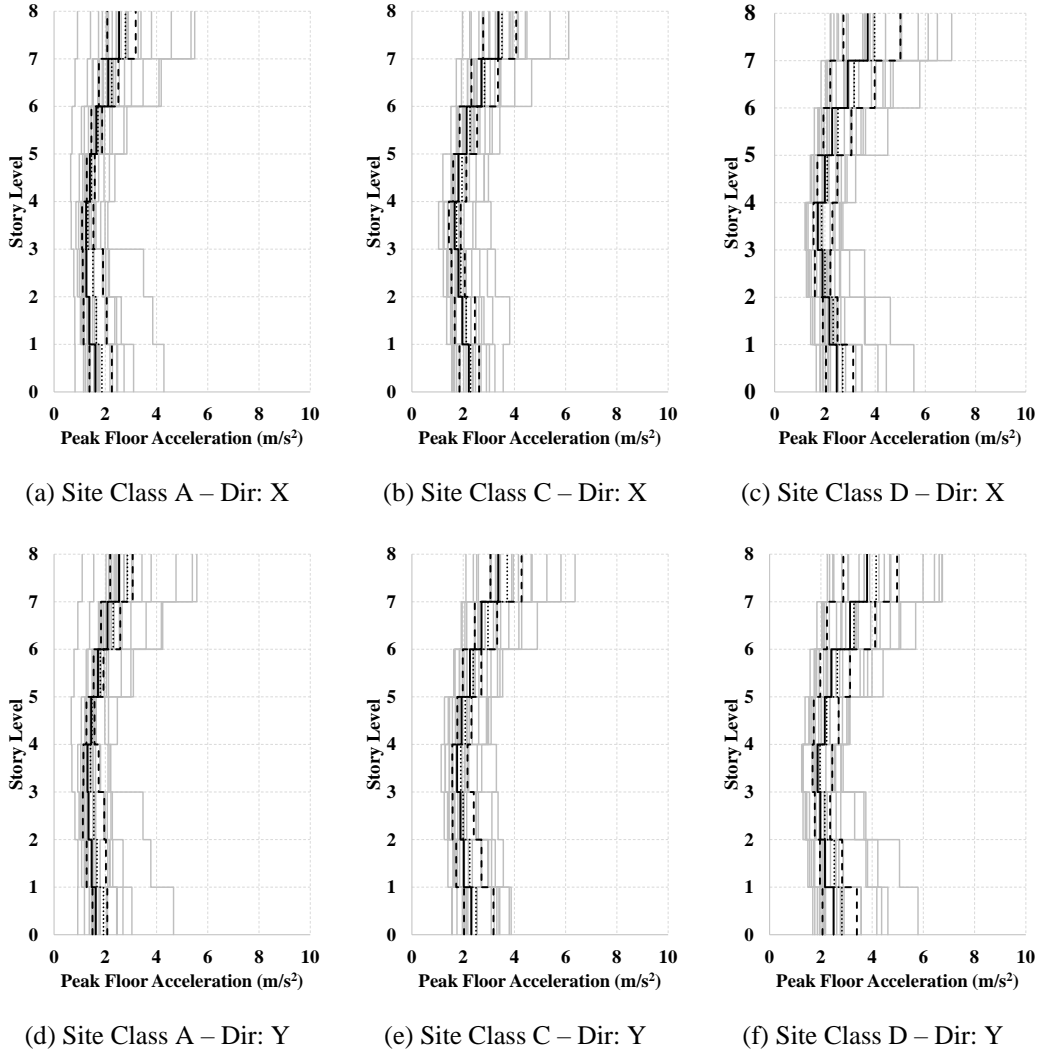
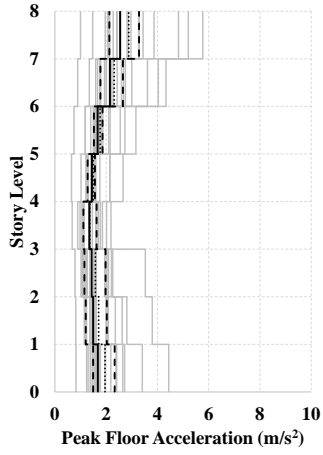
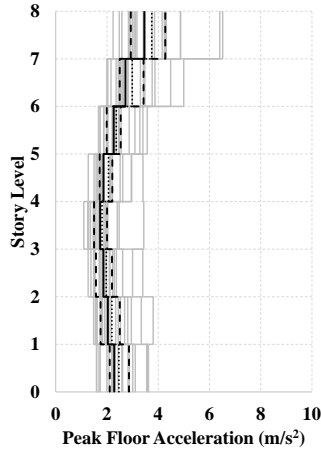


Figure A.17. PFA profiles for building case “T2”

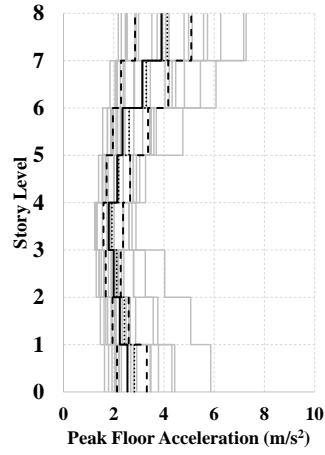
— Individual EQ ···· Mean - - Q1 — Median - - Q3



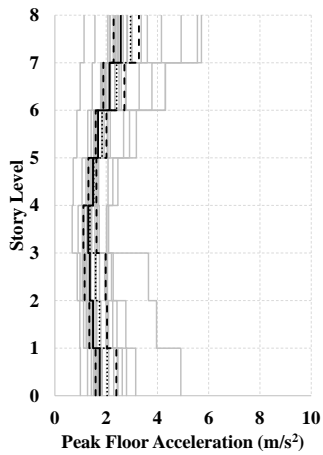
(a) Site Class A – Dir: X



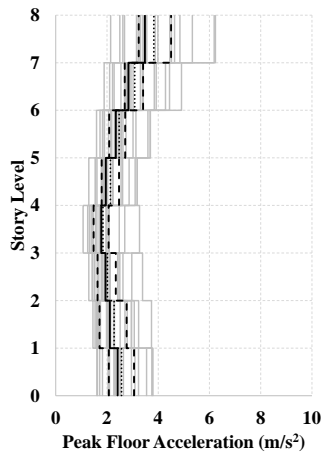
(b) Site Class C – Dir: X



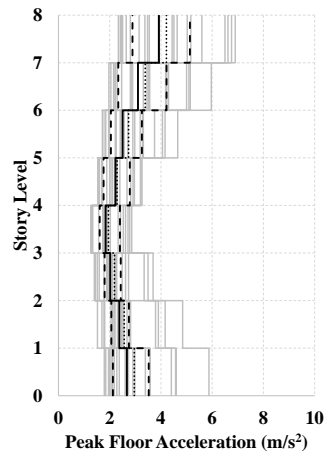
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.18. PFA profiles for building case “T3”

— Individual EQ Mean - -Q1 — Median - -Q3

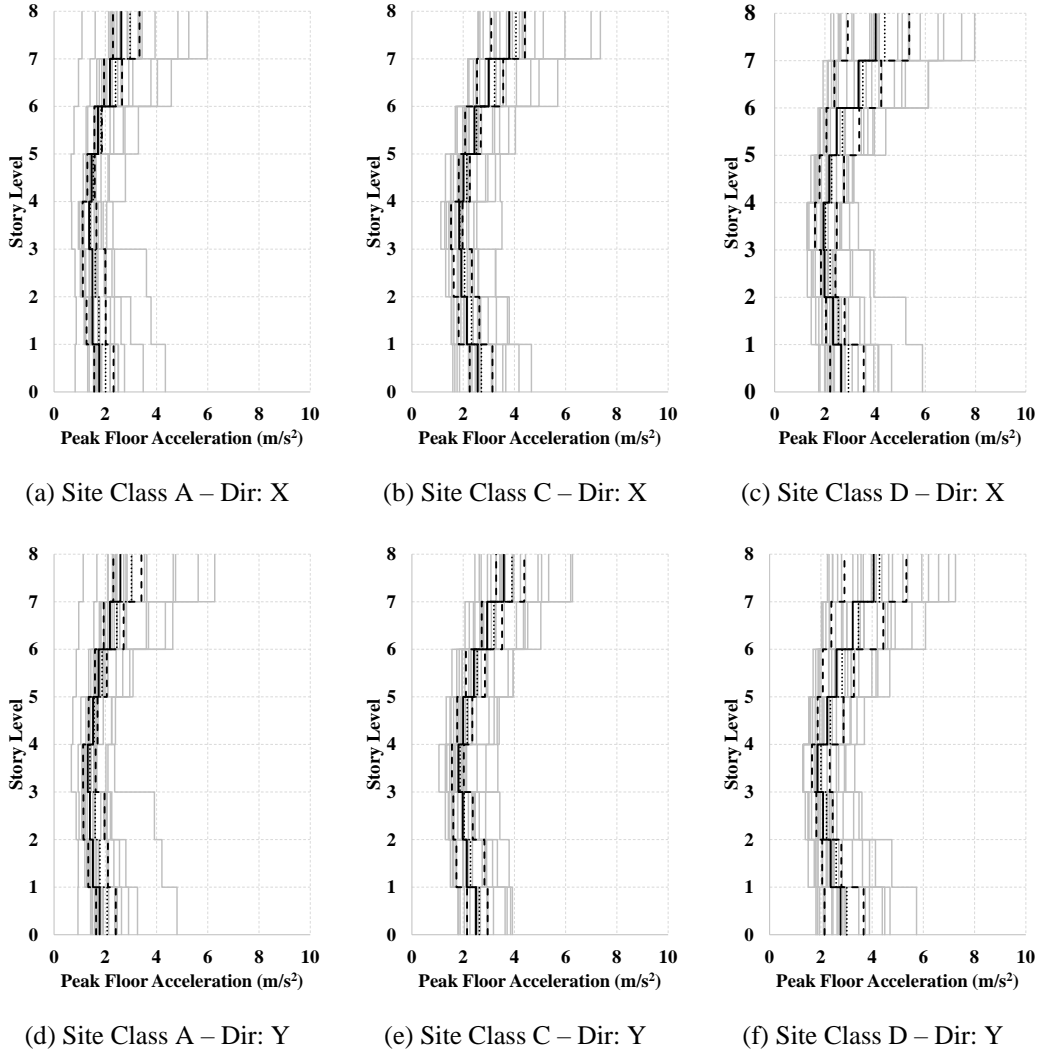
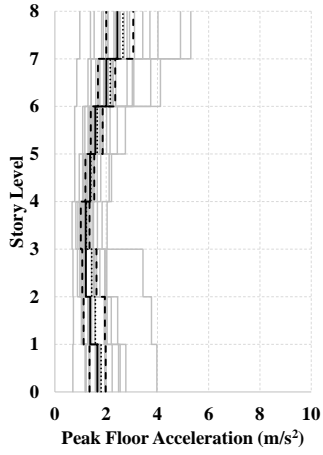
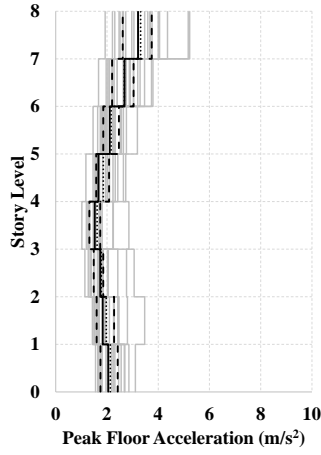


Figure A.19. PFA profiles for building case “T4”

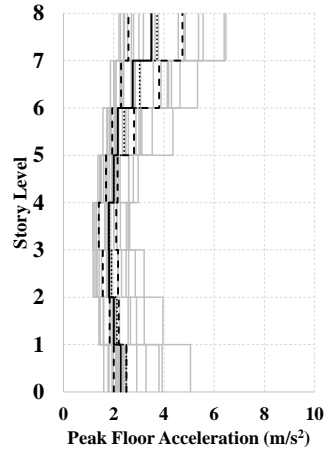
— Individual EQ ···· Mean - - Q1 — Median - - Q3



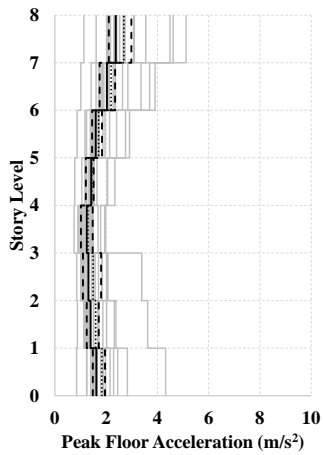
(a) Site Class A – Dir: X



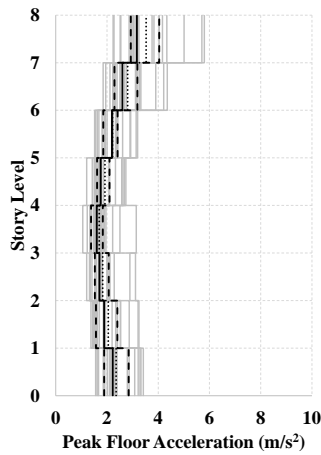
(b) Site Class C – Dir: X



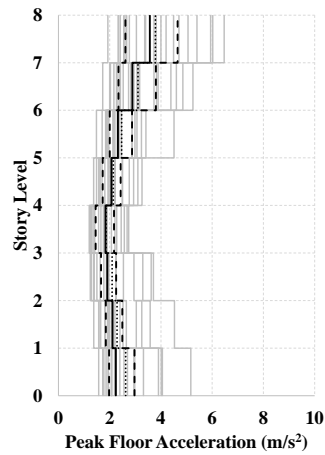
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.20. PFA profiles for building case “U1”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

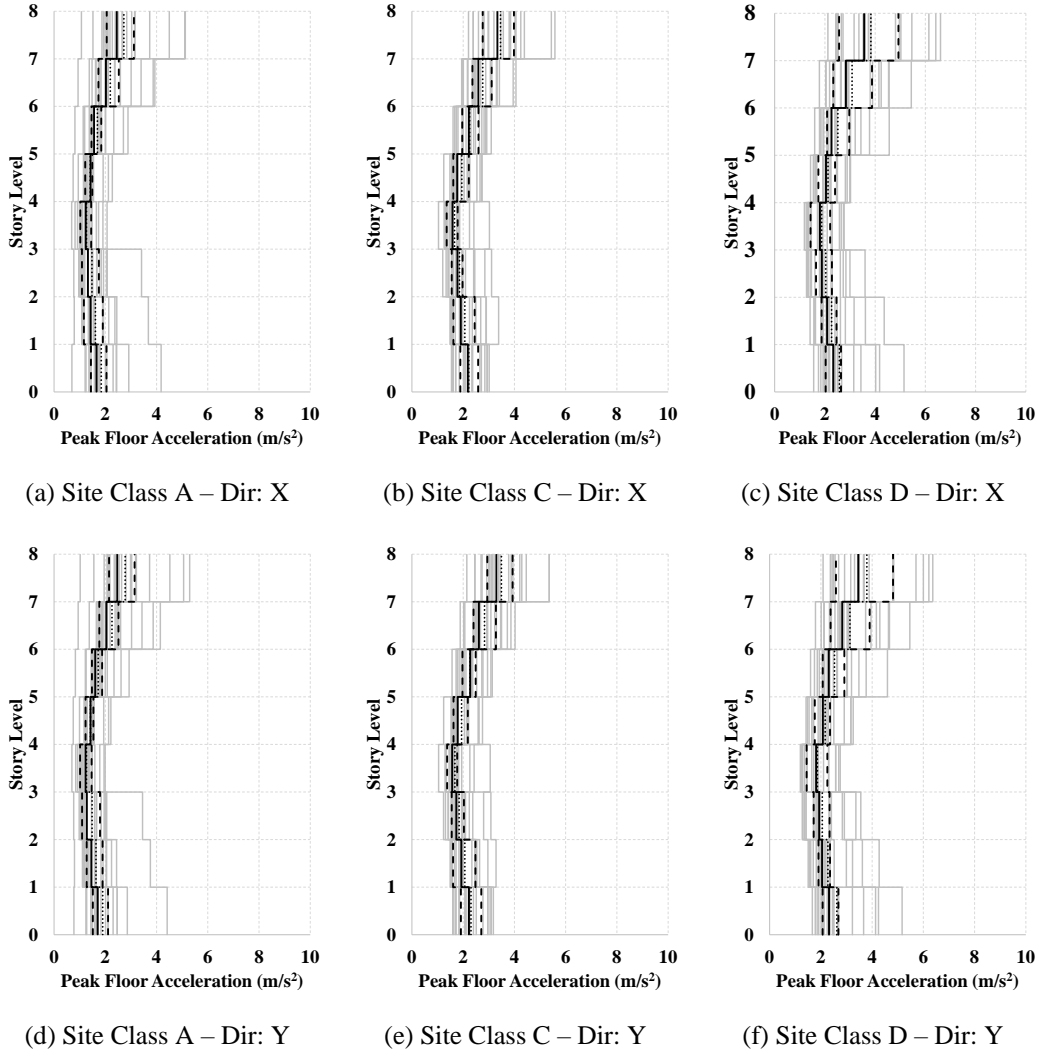
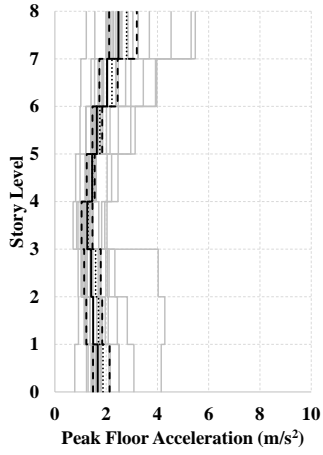
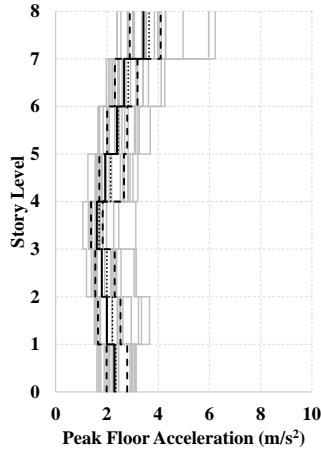


Figure A.21. PFA profiles for building case “U2”

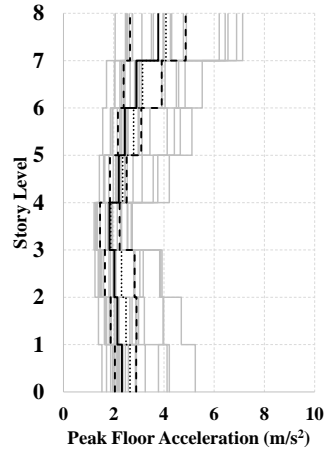
— Individual EQ Mean - - Q1 — Median - - Q3



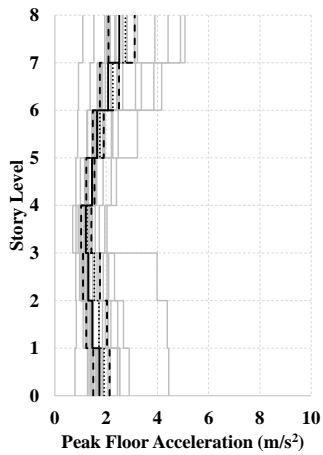
(a) Site Class A – Dir: X



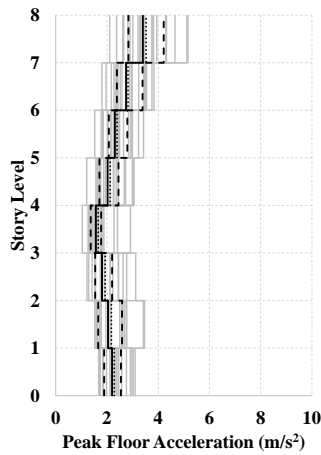
(b) Site Class C – Dir: X



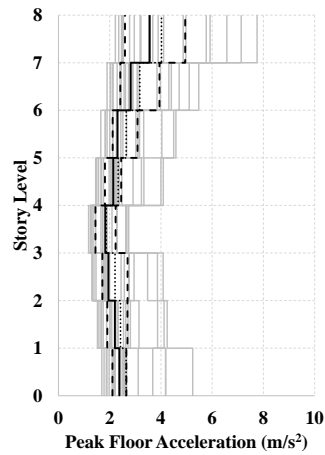
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.22. PFA profiles for building case “U3”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

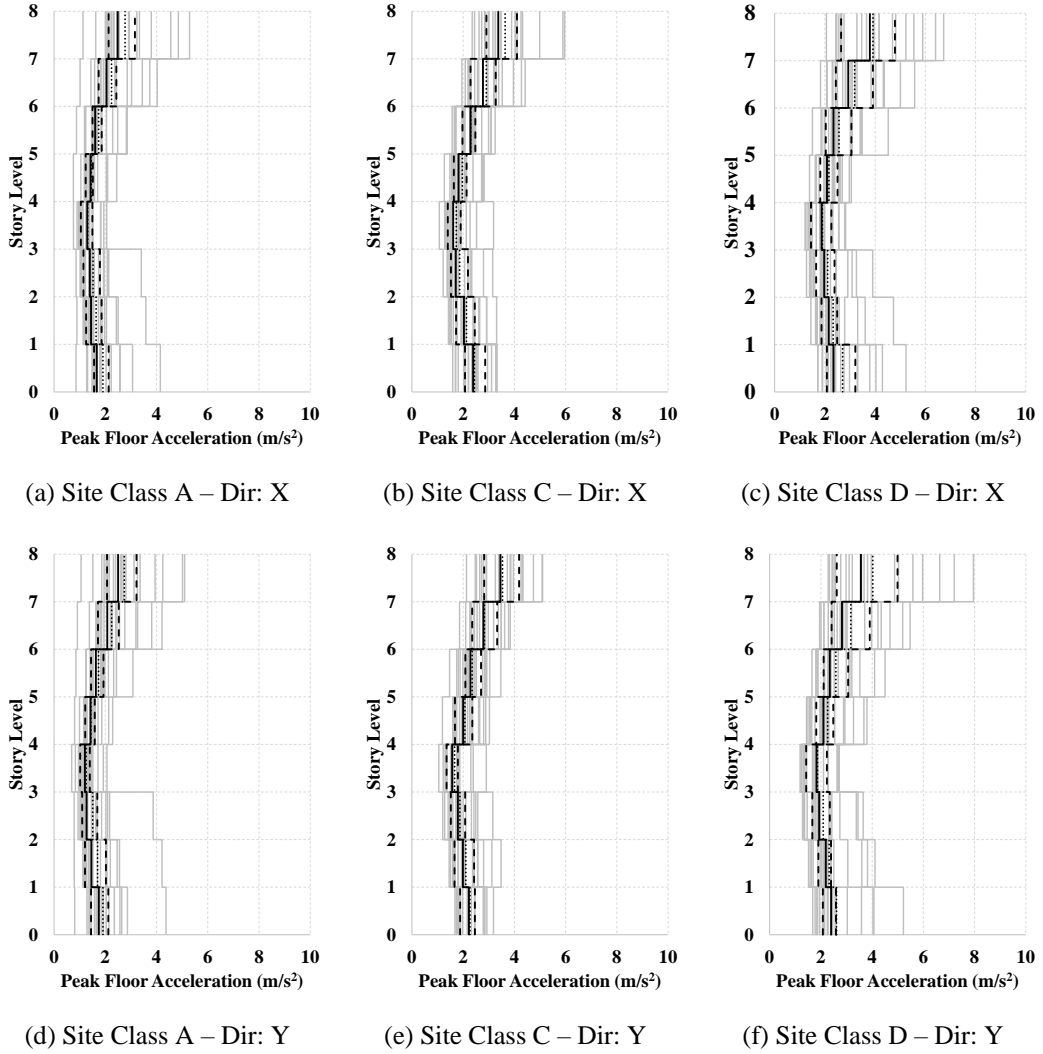
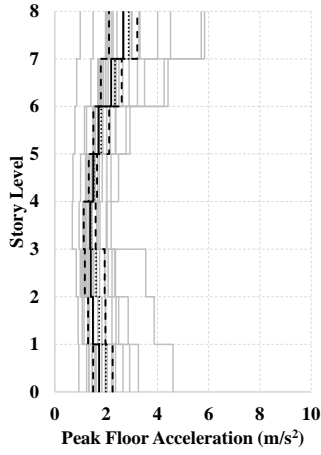
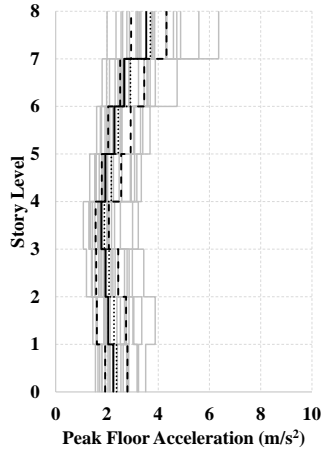


Figure A.23. PFA profiles for building case “U4”

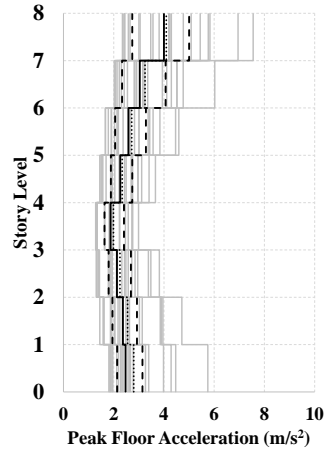
— Individual EQ Mean - - Q1 — Median - - Q3



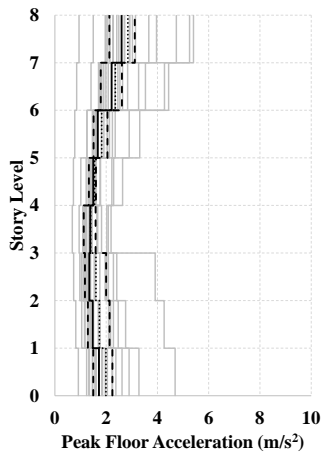
(a) Site Class A – Dir: X



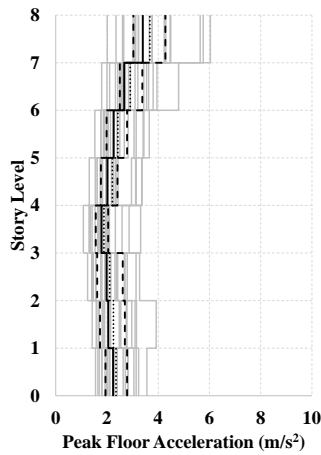
(b) Site Class C – Dir: X



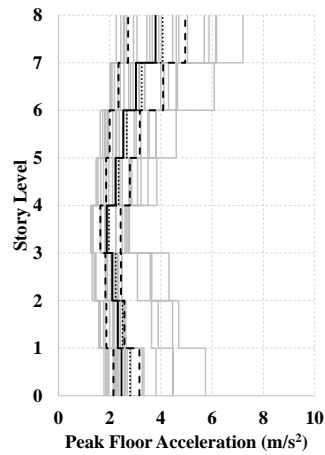
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.24. PFA profiles for building case “Symmetric Mass”

— Individual EQ ···· Mean - -Q1 — Median - -Q3

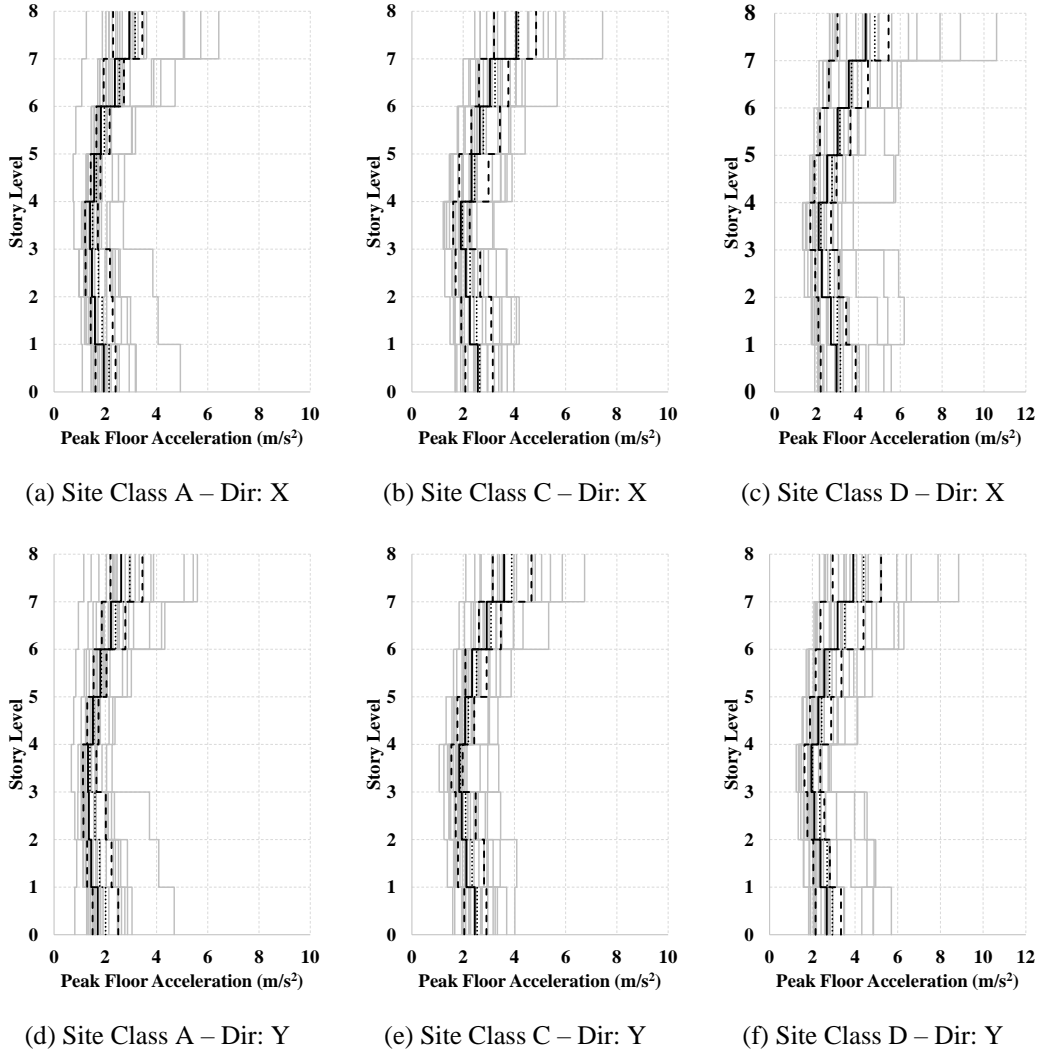
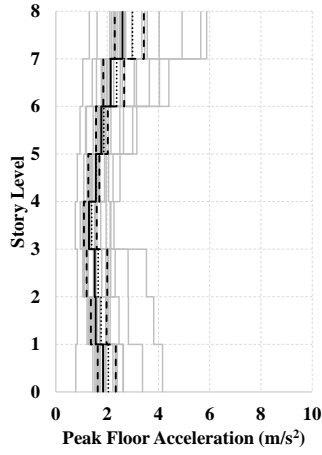
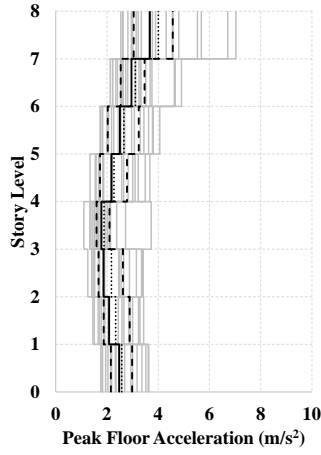


Figure A.25. PFA profiles for building case “T4 Mass”

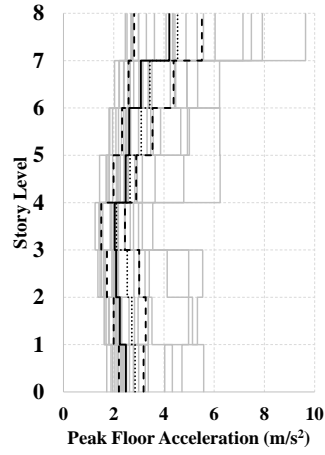
— Individual EQ ···· Mean - - Q1 — Median - - Q3



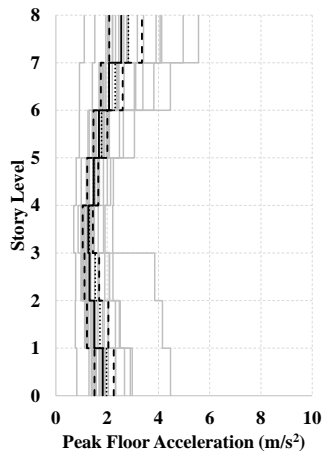
(a) Site Class A – Dir: X



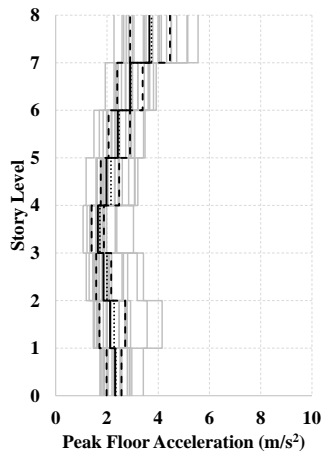
(b) Site Class C – Dir: X



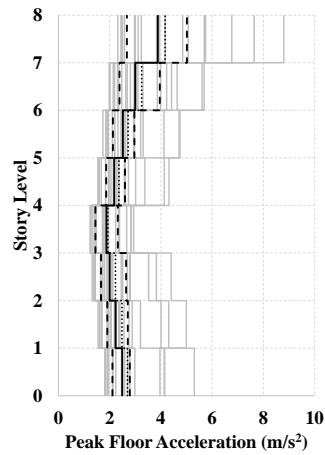
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



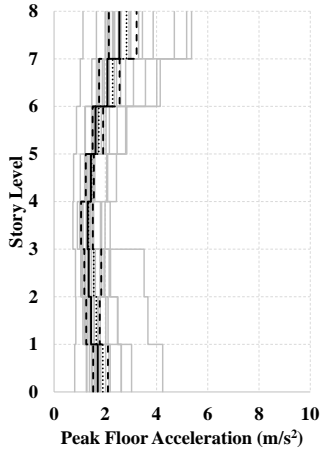
(e) Site Class C – Dir: Y



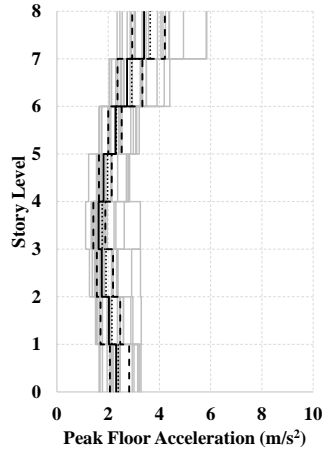
(f) Site Class D – Dir: Y

Figure A.26. PFA profiles for building case “U4 Mass”

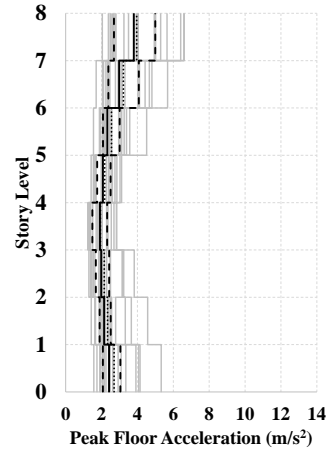
— Individual EQ ···· Mean - -Q1 — Median - -Q3



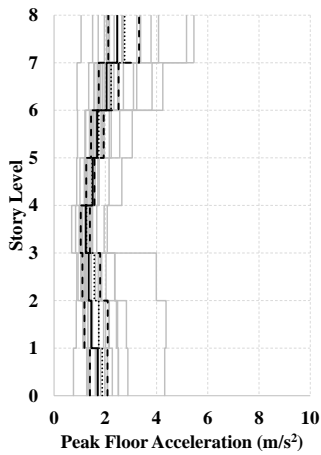
(a) Site Class A – Dir: X



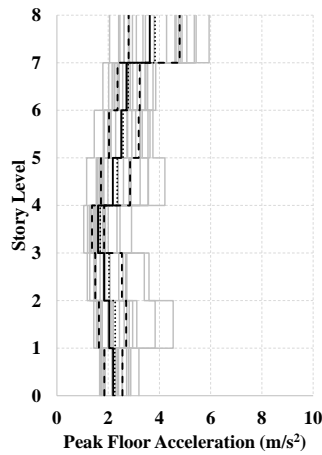
(b) Site Class C – Dir: X



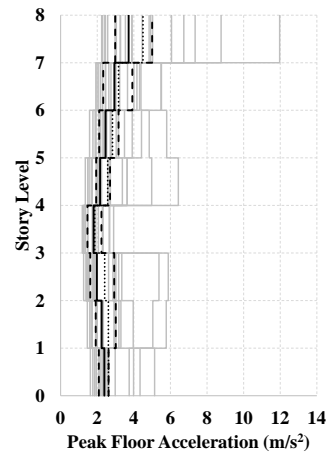
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



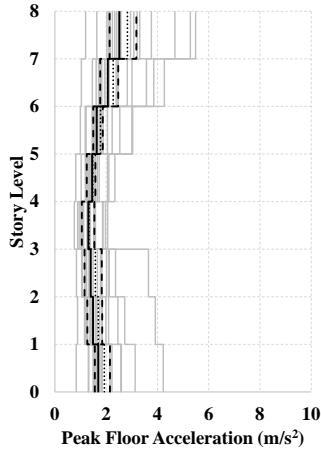
(e) Site Class C – Dir: Y



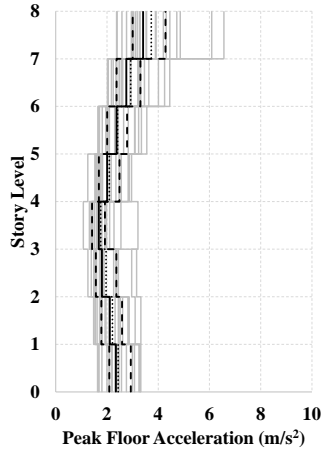
(f) Site Class D – Dir: Y

Figure A.27. PFA profiles for building case “U4 Group 1”

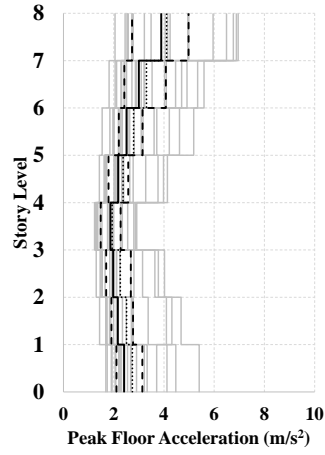
— Individual EQ ···· Mean - - Q1 — Median - - Q3



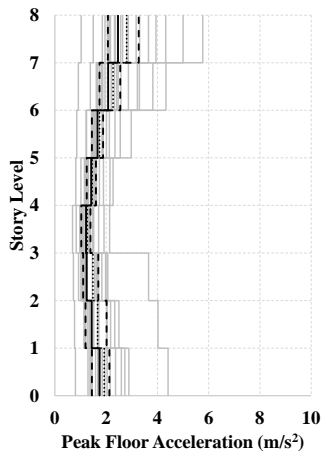
(a) Site Class A – Dir: X



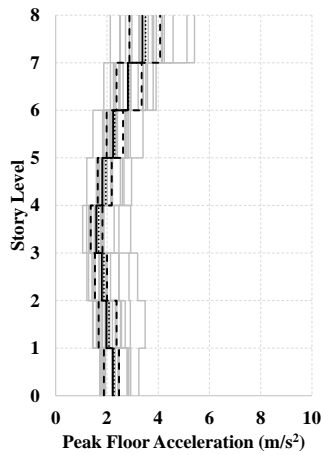
(b) Site Class C – Dir: X



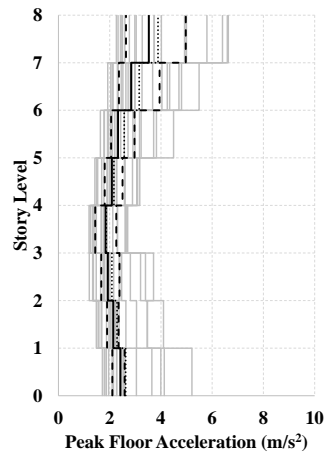
(c) Site Class D – Dir: X



(d) Site Class A – Dir: Y



(e) Site Class C – Dir: Y



(f) Site Class D – Dir: Y

Figure A.28. PFA profiles for building case “U4 Group 5”