

Appendix for the Design Guidelines for Type A (Self-Built) Pavilions

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The information and data herein concerning the ground at the Expo site are those estimated from the results of past surveys and for reference purposes only. It is recommended that in planning a facility, participants consider introducing floating foundation or pile foundation as explained as examples of preventive measures against the settlement of buildings.

1. Information about the Ground at the Expo Site (Just For Reference)

1) Overview about the Ground

- As of year 2021, the Pavilion World has roughly two areas: area under reclamation (Sections A, B and C) and reclaimed area (in the north and the east).
- Section A (with a width of approx. 40 meters, or approx. 40-130 meters at the western edge) neighbours with the inner seawall and reclaimed area. Sections B and C have a different thickness of earth fill from each other.
- The earth beneath the reclaimed (and to be reclaimed) areas has the following layers in the order from top to bottom: earth fill layer; reclaimed cohesive soil layer; sand layer; alluvial clay layer; and diluvial layer (an alternate layer of diluvial gravel and clay). The reclaimed clay layer and the alluvial clay layer are improved through accelerated consolidation (See the tables on the next page).



Map of the Areas at the Pavilion World

Layers of Earth at the Pavilion World
(a) Area under reclamation (Section A)
Reclaimed area (adjacent with the inner seawall)

Layer of earth	Thickness	Consolidation settlement
Earth fill layer	Approx. 4 m	Will not occur
Reclaimed clay layer (Improved)	Approx. 5–24 m	Will occur
Sand layer (Inner seawall's foundation)	Approx. 0–10 m	Will not occur
Alluvial clay layer (Improved)	Approx. 12–16 m	Will occur
Alluvial clay layer (Unimproved)	Approx. 9 m	Will occur
Diluvial clay layer	–	Will occur

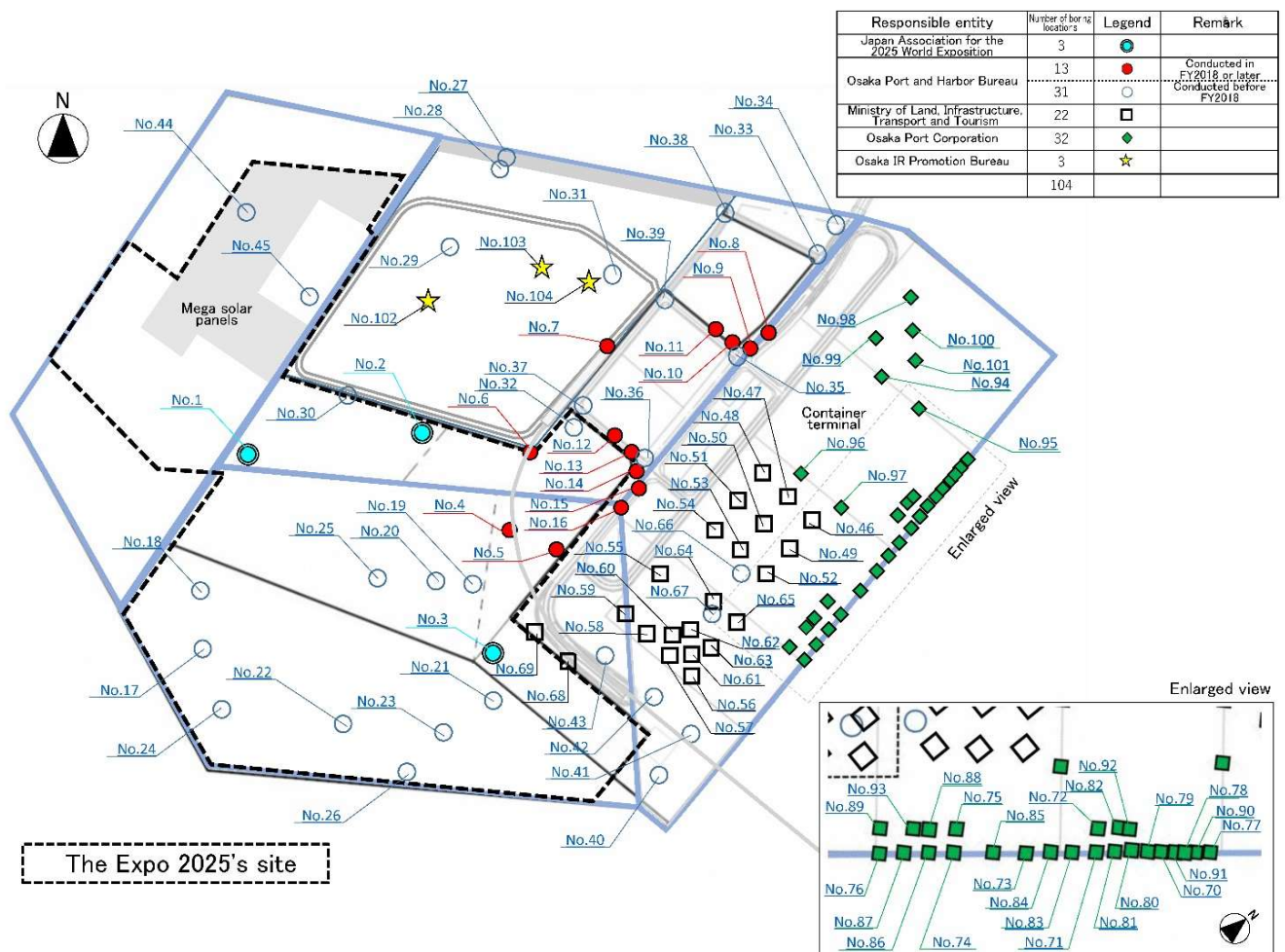
(b) Area under reclamation (Sections B and C)
Reclaimed area (portions other than the one adjacent with the inner seawall)

Layer of earth	Thickness	Consolidation settlement
Earth fill layer	Approx. 4 m	Will not occur
Reclaimed clay layer (Improved)	Approx. 18–24 m	Will occur
Sand blanket layer	Approx. 1 m	Will not occur
Alluvial clay layer (Improved)	Approx. 8–16 m	Will occur
Alluvial clay layer (Unimproved)	Approx. 9 m	Will occur
Diluvial clay layer	–	Will occur

* The data in the tables (a) and (b) above are for reference purposes only; the data were merely estimated from the results of past surveys.

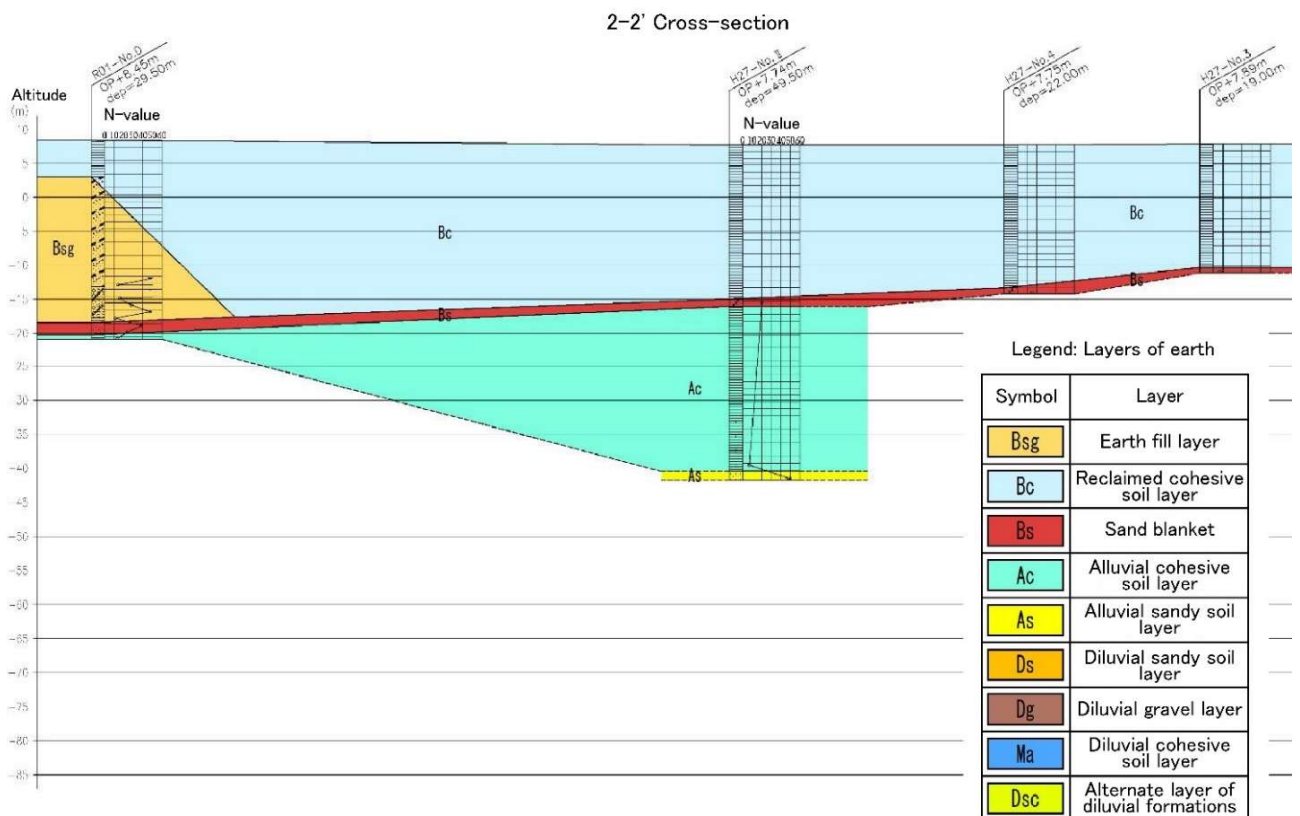
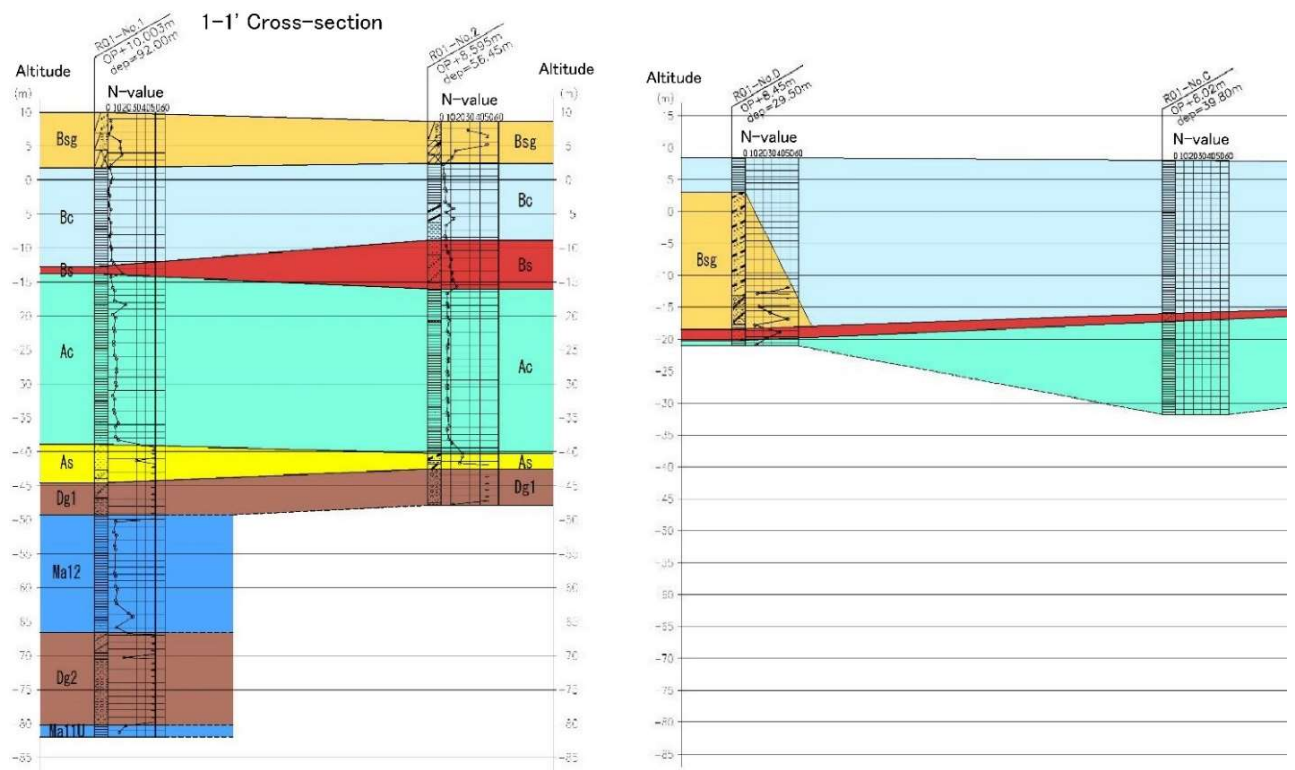
2) Results of Past Surveys on the Ground

- The results of boring surveys conducted at the Pavilion World are made available on the websites of the Osaka Port and Harbor Bureaus (City of Osaka) and Japan Association for the 2025 World Exposition.
<https://www.city.osaka.lg.jp/port/page/0000506387.html> (in Japanese) (Columnar section data only)

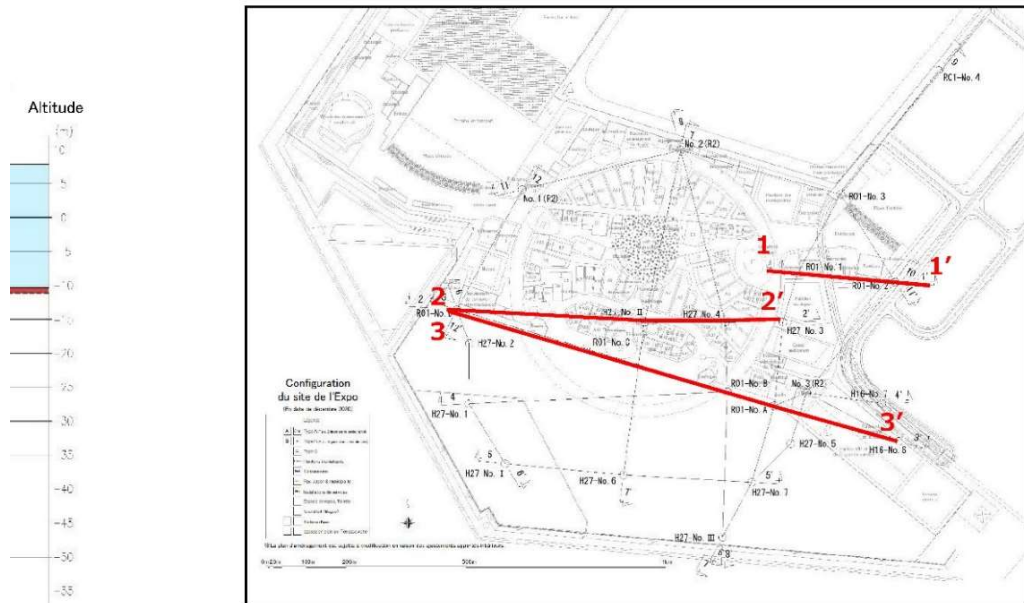
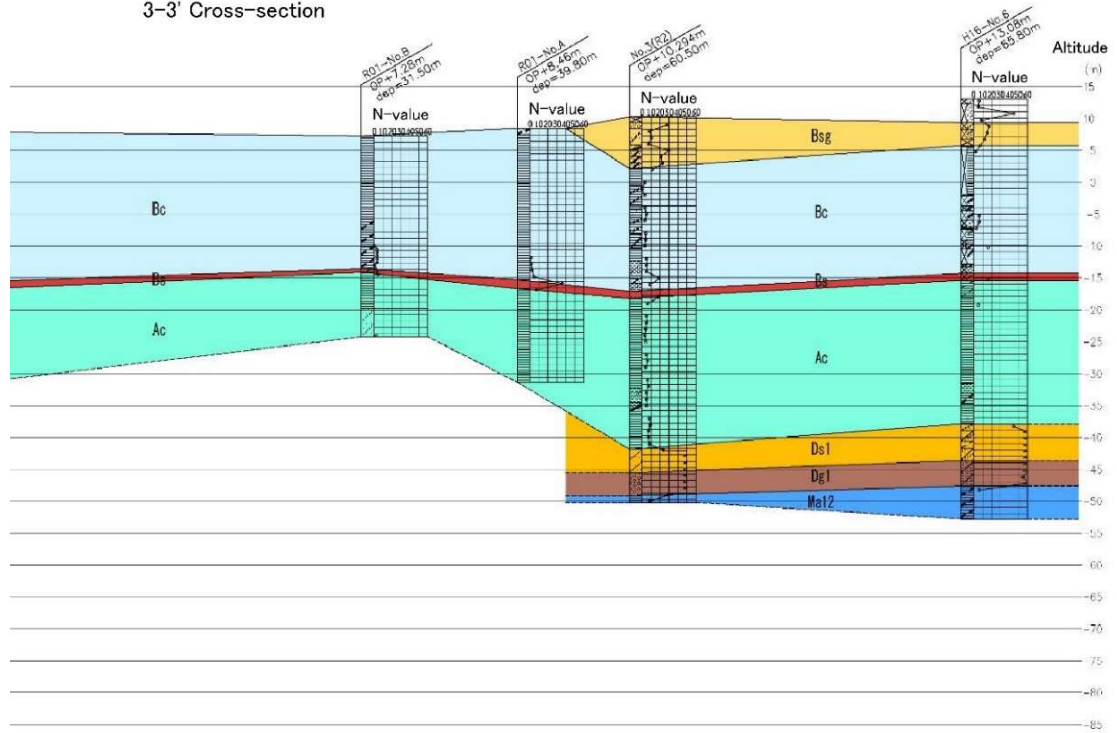


3) Cross-Sectional Layers of Earth

Please see the next pages to find as a reference the geological cross-section diagrams developed from the results of boring surveys conducted at the Pavilion World and its vicinity.



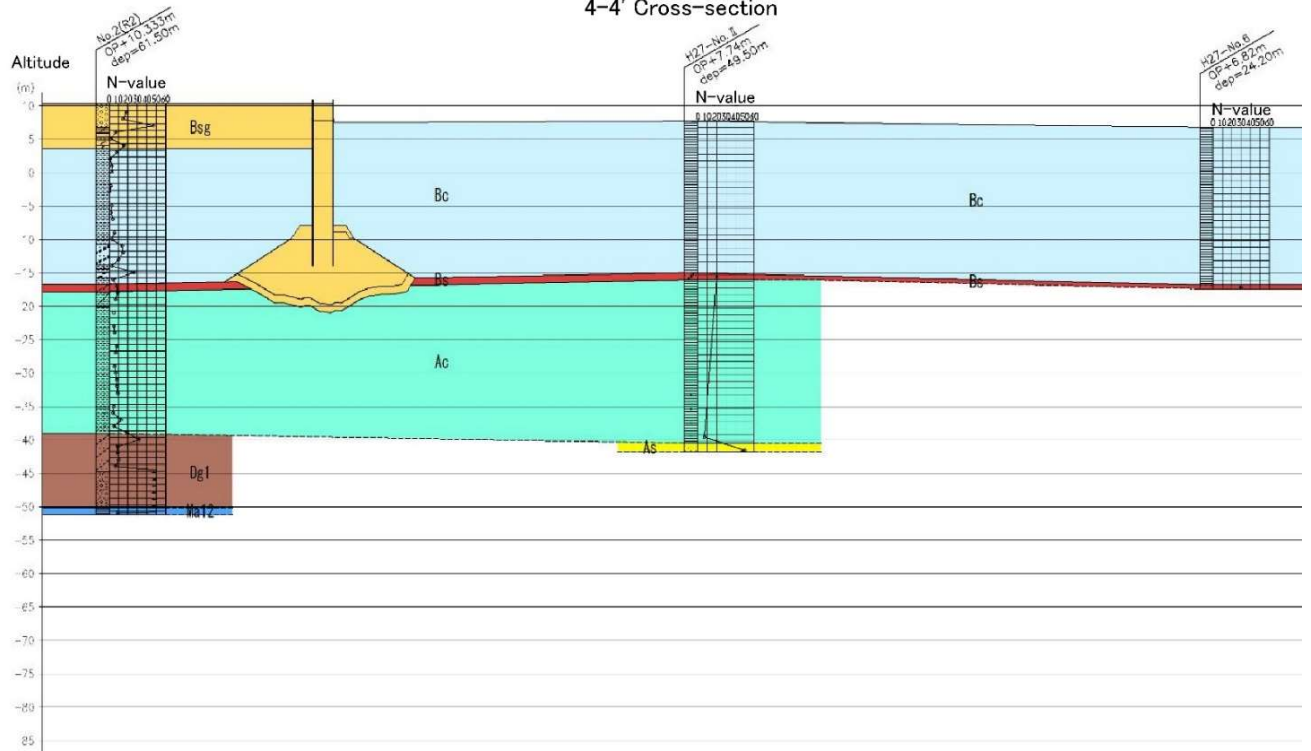
3-3' Cross-section



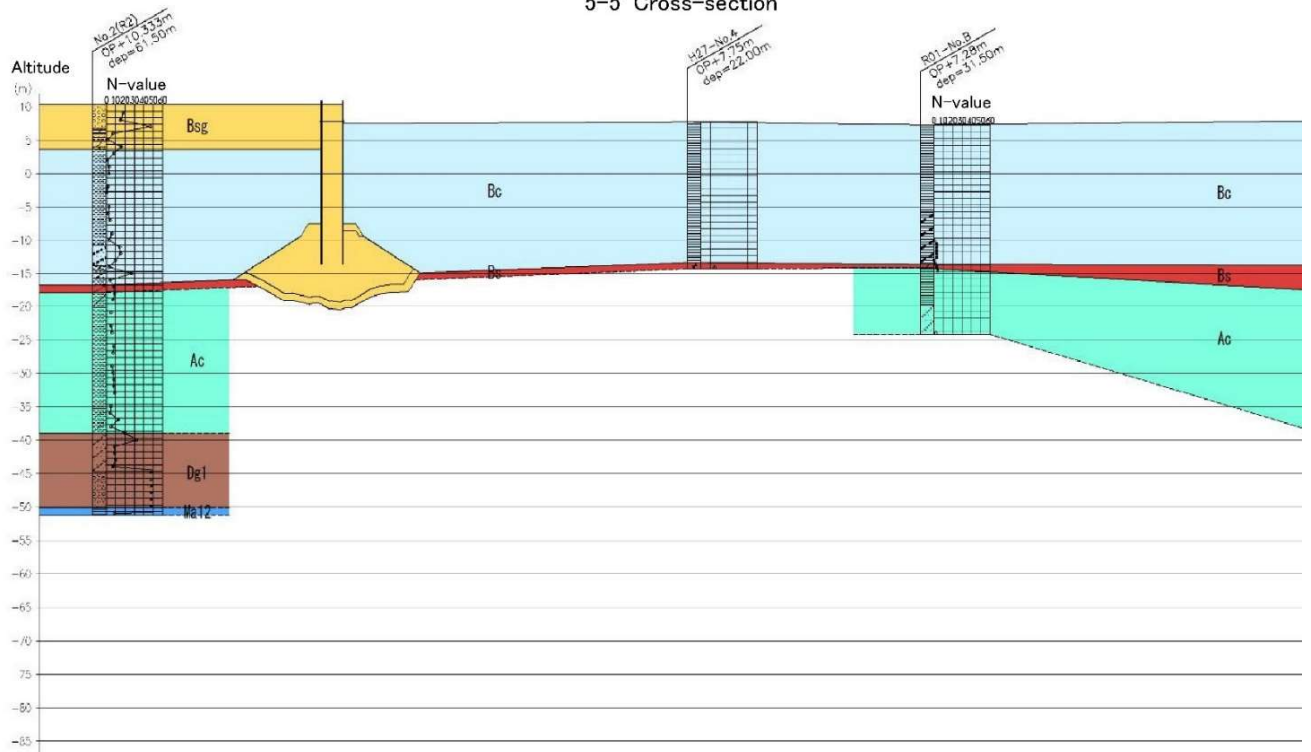
- ※H16-No.16-6,16-7 : Boring conducted in May-Jun 2004
- H27-No.Ⅱ,3,4 : Boring conducted in Nov-Dec 2015
- R01-No.A~D : Boring conducted in Jun-Jul 2019
- R01-No.1~4 : Boring conducted in Apr-Jul 2019
- No.1(R2)~3(R2) : Boring conducted in Jan-Feb 2020

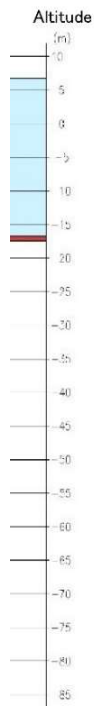
Geological Cross-Sections at the Pavilion World (1/4)

4-4' Cross-section



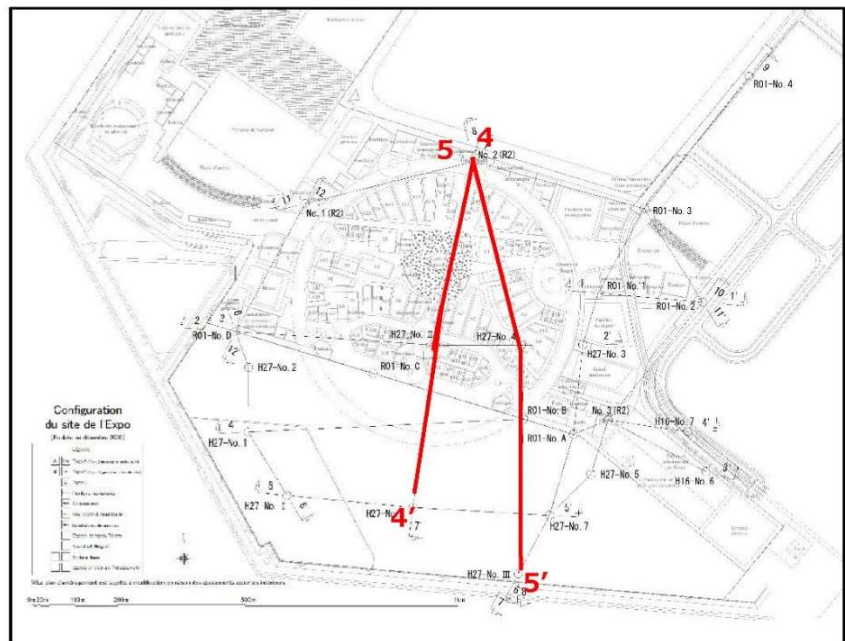
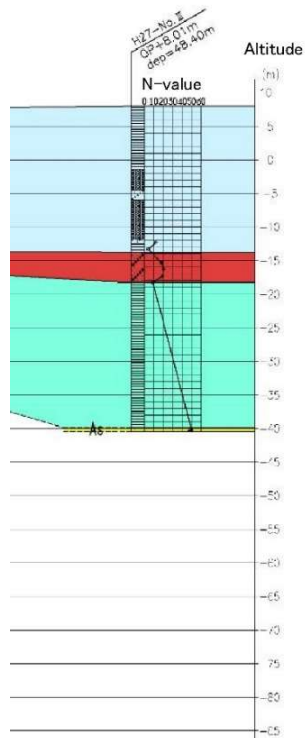
5-5' Cross-section





Legend: Layers of earth

Symbol	Layer
Bsg	Earth fill layer
Bc	Reclaimed cohesive soil layer
Bs	Sand blanket
Ac	Alluvial cohesive soil layer
As	Alluvial sandy soil layer
Ds	Diluvial sandy soil layer
Dg	Diluvial gravel soil layer
Ma	Diluvial cohesive soil layer
Dsc	Alternate layer of diluvial formations



※H16-No16-6,16-7 : Boring conducted in May-Jun 2004

H27-No. II,3,4 : Boring conducted in Nov-Dec 2015

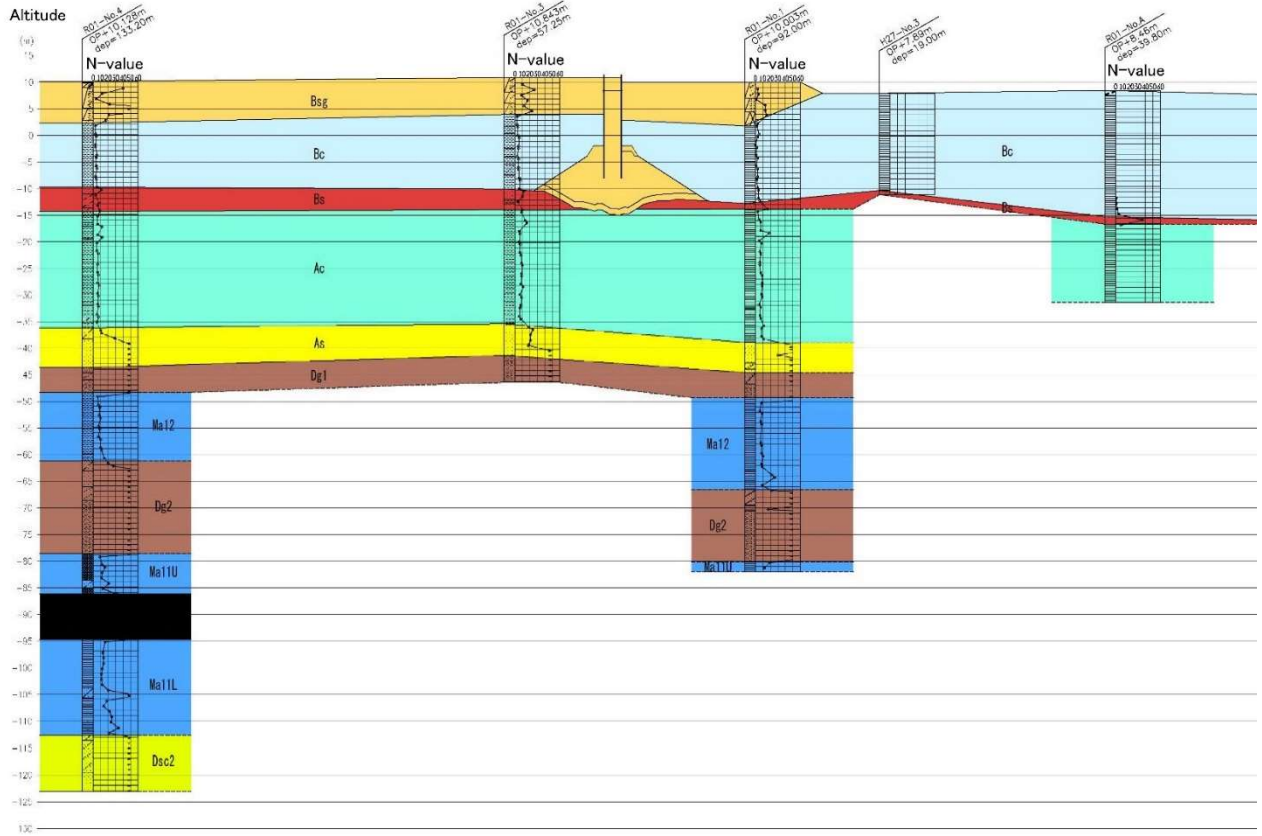
R01-NoA~D : Boring conducted in Jun-Jul 2019

R01-No1~4 : Boring conducted in Apr-Jul 2019

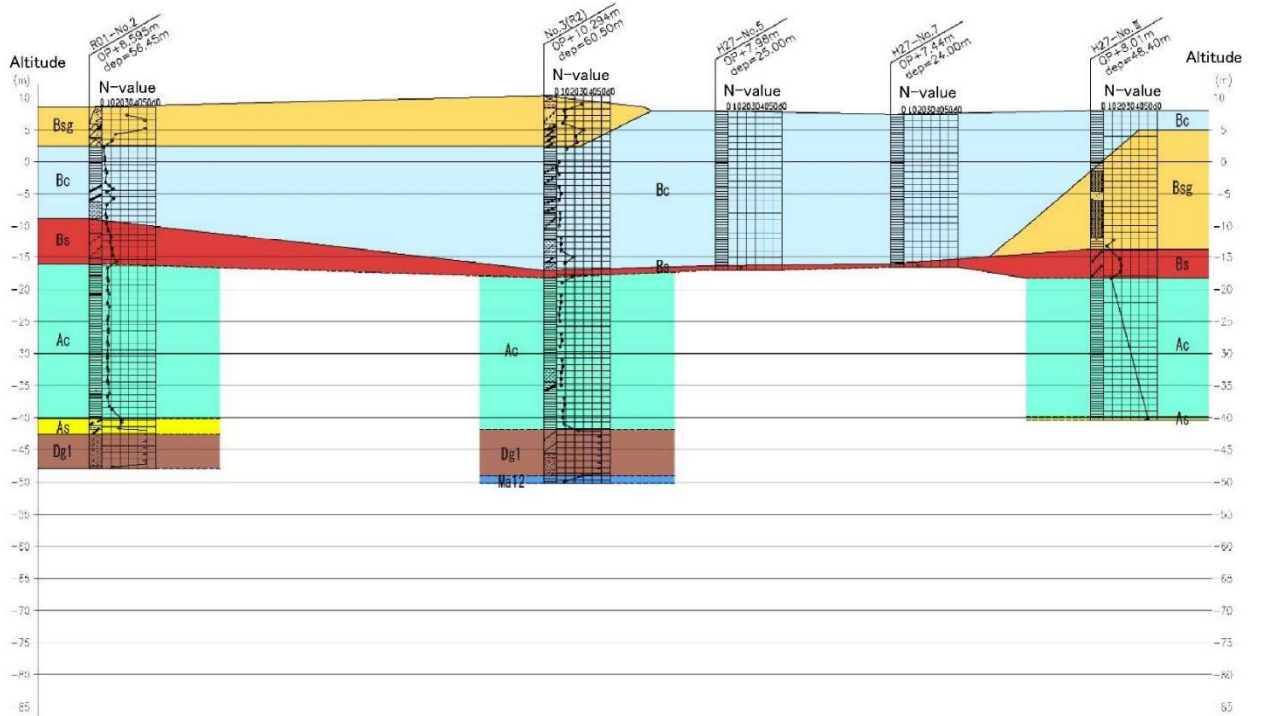
No1(R2)~3(R2) : Boring conducted in Jan-Feb 2020

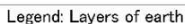
Geological Cross-Sections beneath the Pavilion World (2/4)

6-6' Cross-section



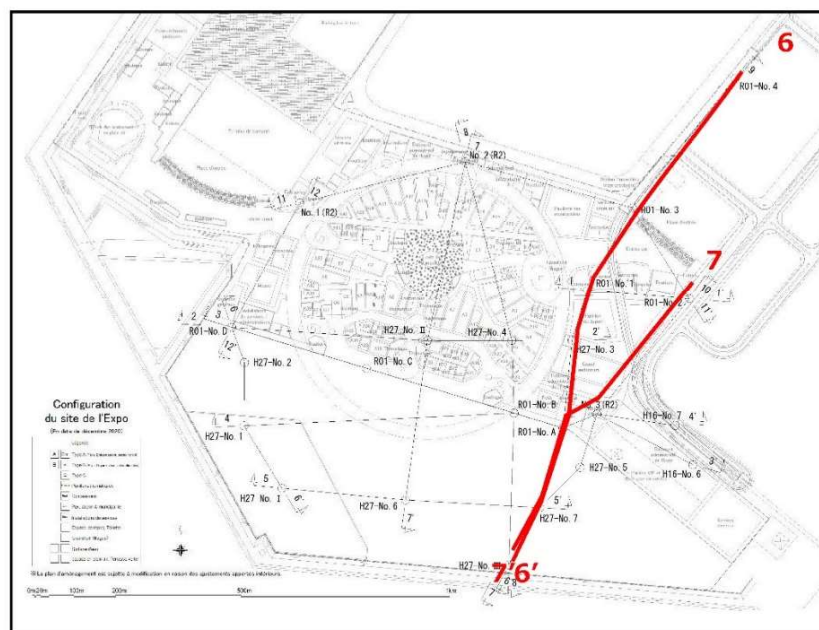
7-7' Cross-section





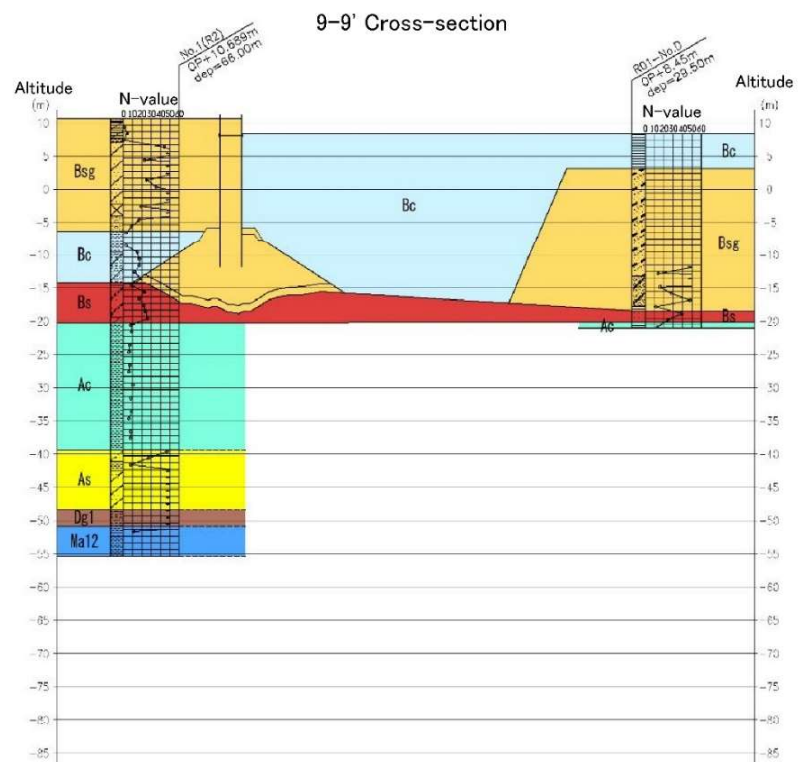
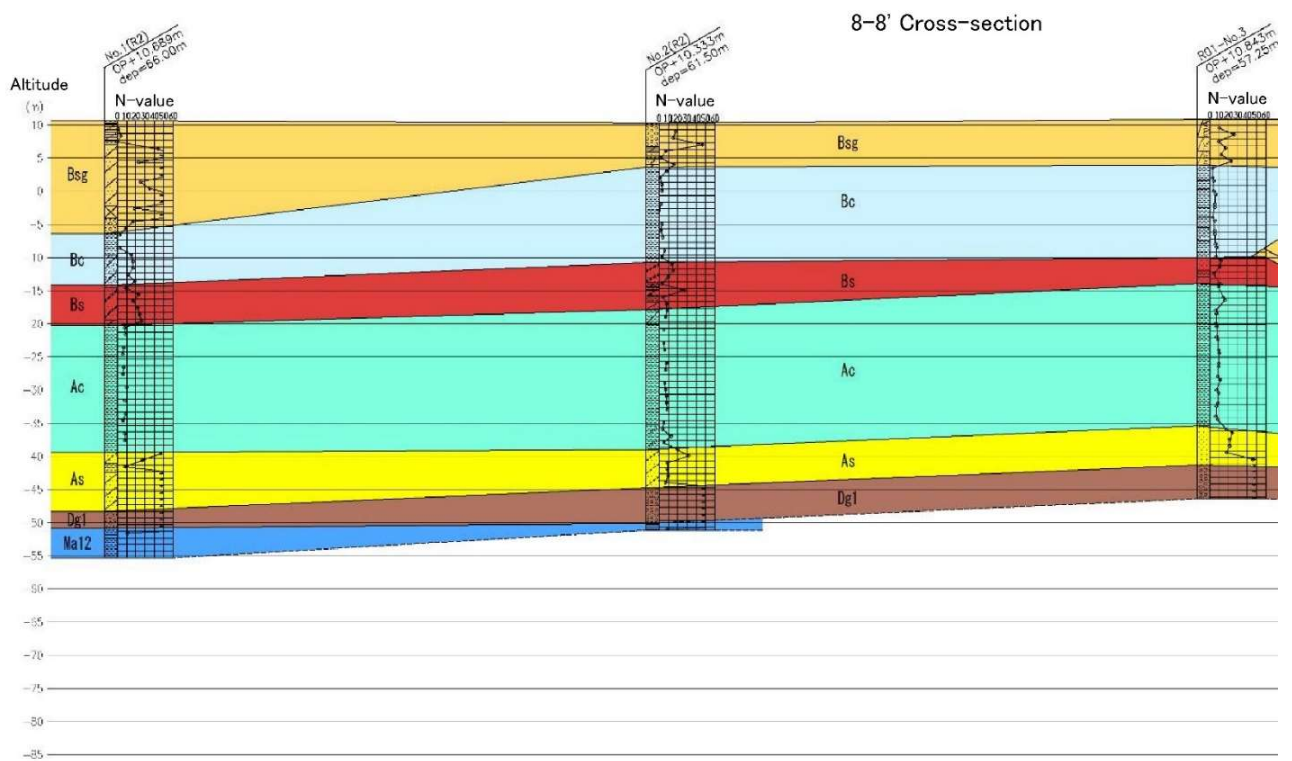
Symbol	Layer
B _{sg}	Earth fill sandy/gravel soil
B _c	Reclaimed cohesive soil layer
B _s	Reclaimed sand blanket layer
A _c	Alluvial cohesive soil layer
A _s	Alluvial sand layer
D _s	Diluvial sandy soil layer
D _g	Diluvial gravel soil layer
M _a	Marine clay layer
D _{sc}	Alternate layer of cohesive and sandy soils

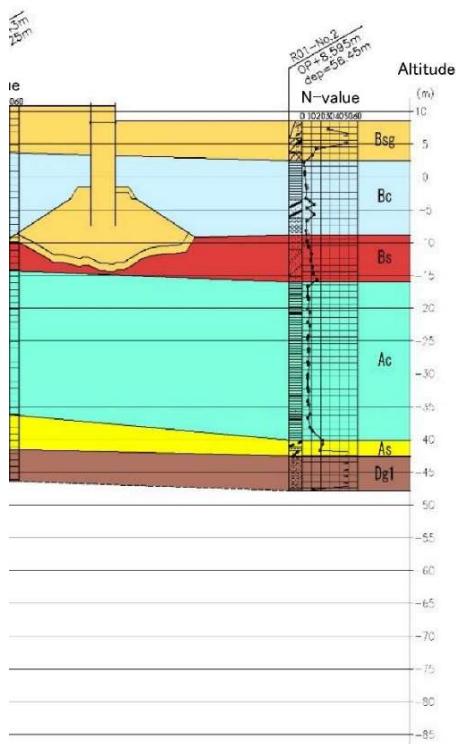
Symbol	Layer
Bsg	Earth fill layer
Bc	Reclaimed cohesive soil layer
Bs	Sand blanket
Ac	Alluvial cohesive soil layer
As	Alluvial sandy soil layer
Ds	Diluvial sandy soil layer
Dg	Diluvial gravel soil layer
Ma	Diluvial cohesive soil layer
Dsc	Alternate layer of diluvial formations



No.1(R2)~3(R2) : Boring conducted in Jan-Feb 2020

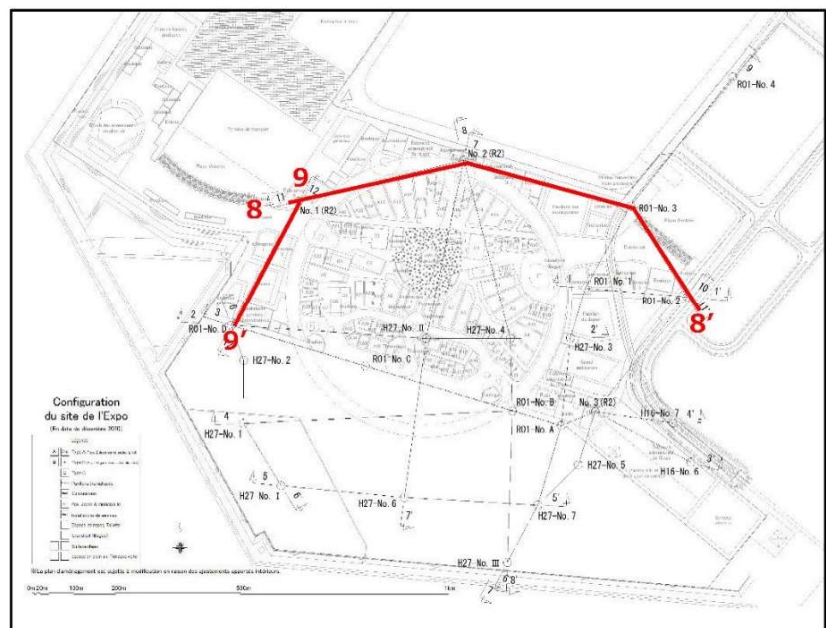
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Legend: Layers of earth

Symbol	Laye
Bsg	Earth fill layer
Bc	Reclaimed cohesive soil layer
Bs	Sand blanket
Ac	Alluvial cohesive soil layer
As	Alluvial sandy soil layer
Ds	Diluvial sandy soil layer
Dg	Diluvial gravel soil layer
Ma	Diluvial cohesive soil layer
Dsc	Alternate layer of diluvial formations



※H16-No.16-6,16-7 : Boring conducted in May-Jun 2004

H27-No.Ⅱ,3,4 : Boring conducted in Nov-Dec 2015

R01-No.A~D : Boring conducted in Jun-Jul 2019

R01-No.1~4 : Boring conducted in Apr-Jul 2019

No.1(R2)~3(R2) : Boring conducted in Jan-Feb 2020

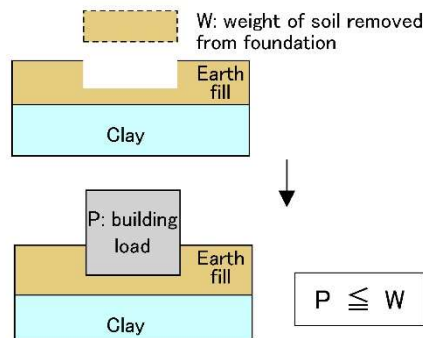
Geological Cross-Sections beneath the Pavilion World (4/4)

4) Preventive Measure against the Settlement of Buildings (For Your Reference)

If the weight of pavilions or other buildings is directly loaded from their foundations on the ground near the surface at the Pavilion World, settlement of the ground may occur due to the load from those buildings, etc. and consequently consolidation of the reclaimed clay layer. A measure against settlement due to the weight of buildings, etc., would be using a floating or pile foundation, both of which are the types of foundation designed to prevent the building from applying its weight on the ground near the surface.

(1) Floating foundation

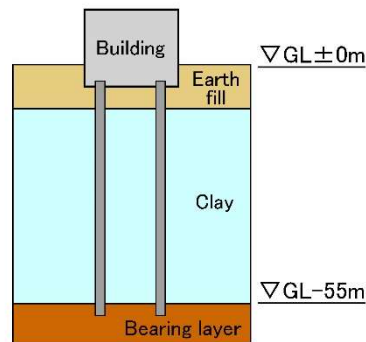
A floating foundation prevents the occurrence of additional consolidation settlement due to the weight of a building on which it will newly stand by making the weight of the building (reaction force from the bottom of the foundation) is equal to or less than the weight of the soil removed from the foundation. Even if employing a floating foundation, however, you would still need to use a lightweight foundation or a foundation of a shape that will help the even application of the weight of the building on the ground.



Floating foundation

(2) Pile foundation

A pile foundation reduces the risk of settlement by supporting the building with the bearing layer at the top of piles. Please be noted that you need to withdraw and remove the piles from the ground after the Expo is over, and that the site is a newly reclaimed area and therefore the building may float upward due to consolidation settlement of the reclaimed clay layer.



Pile foundation

5) Matters of Attention and Restrictions to Remember When Designing a Facility

a. Matters of attention

- The site is a newly reclaimed area and consolidation settlement will continue to occur at the reclaimed clay layer during the Expo's construction period (April 2023 - April 2025). You should keep in mind the risk when designing your facility.
- Consolidation settlement will possibly occur due to vertical loads from buildings, etc. Therefore, you should employ a measure or a type of foundation designed to minimize the extent of such settlement.

b. Restrictions

- The land must be restored to the original conditions and returned to the owner after the Expo is over. Therefore, you need to choose a foundation technique that will allow you to remove the foundation after the Expo is over, whether it is a pile or spread foundation. You also need to remove all devices and accessories attached to the foundation.
- You are permitted to excavate only up to the depth of 2.5 m from the ground surface. However, that requirement excludes drilling holes for piling. You need to observe the Soil Contamination Countermeasures Act of Japan, because the Expo's site is subject to the law. Details will be announced later in the (tentatively titled) Construction and Demolition Guidelines for Type A (Self-Built) Pavilions when the guidelines are ready.

[FYI] The earth filling work is scheduled to end at the end of March, 2022. The excavation depth is set as 2.5 m or less by the Organiser in order to prevent any excavation, etc., from affecting the sand (drainage) layer beneath the earth fill layer, whose minimum thickness will be around 3.0 m according to the design. Meanwhile, it is recommended to adopt a floating or piling foundation as a means to prevent ground settlement due to the reclaimed clay layer's consolidation; these types of foundations support the ground against vertical loads from the building on which it will stand. When, for example, the unit load of a building is approx. 4 tf/m² and if the wet unit weight of the soil is approx. 1.8 tf/m³, you will be able to construct a building on a floating foundation by drilling the land around 2.5 m deep (and the weight of the earth displaced will be calculated as follows: 1.8 tf/m³ x 2.5 m = approx. 4.5 tf/m²).

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2. Matters of Attention Concerning the Environment

1) Ensuring a Certain Level of Overall Environmental Performance

<C-22>

1-1. CASBEE® for Temporary Construction

1-1-1. Overview about CASBEE®

CASBEE® (Comprehensive Assessment System for Built Environment Efficiency) is a tool developed to evaluate the environmental performance of buildings, town blocks and cities from a wide range of perspectives. CASBEE® is a system that is the most commonly used in Japan to assess and rate the environmental performance of buildings. The system allows you to comprehensively evaluate the environmental performance of buildings, including the comfortableness of rooms and consideration to landscape, in addition to energy efficiency and the use of environment-friendly materials and equipment. The results of overall evaluation are expressed in five scales from S (excellent) to A, B+, B- and C (poor). For details about CASBEE®, please see the website of the Institute for Building Environment and Energy Conservation (IBEC):

<https://www.ibec.or.jp/CASBEE/> (in Japanese)

<https://www.ibec.or.jp/CASBEE/english/index.htm> (in English)

- How to Get the CASBEE® Assessment Software and Technical Manuals (in Japanese)

You can download the CASBEE® tools for free at the IBEC's website

(<http://www.ibec.or.jp/CASBEE/TC/TC.htm#download>).

Though the assessment software is available in Japanese, the English version of the Technical Manual on CASBEE® for Buildings (New Construction) (only the previous 2014 edition for new construction) is also available for free. (<https://www.ibec.or.jp/CASBEE/english/downloadE.htm>)

1-1-2. Overview about CASBEE® for Temporary Construction

CASBEE® is available for various kinds of assessment. For the assessment of pavilions, you should use CASBEE® for Temporary Construction because pavilions are short-term buildings that will be used only during the Expo's period. CASBEE® for Temporary Construction, by the way, was developed to evaluate the environmental performance of the exhibition facilities of the 2005 World Exposition, Aichi, Japan. Positioned as an extended version of CASBEE® for Buildings (New Construction), CASBEE® for Temporary Construction is based on the former, with some modifications therefrom, such as a change in the coefficient of weight* and the deletion of assessment items not suitable for the assessment of temporary buildings. Two of the buildings which obtained third-party certificates in the assessment with CASBEE® for Temporary Construction include the Nagakute Japan Pavilion and the Seto Japan Pavilion of the 2005 World Exposition, Aichi, Japan.

* The coefficient of weight of LR1: LR2: LR3 = 4:3:3 adopted for CASBEE® for Buildings (New Construction) was changed to LR1: LR2: LR3 = 2:5:3 for CASBEE® for Temporary Construction to place emphasis on initiatives for "LR2: Resources & Materials". As for the coefficient of weight per assessment item, please refer to the Score Sheet (which you will also find in the Assessment Software for CASBEE® for Temporary Construction) in 1-2-2. Assessment Results.

1-1-3. The Design Guidelines for Type A (Self-Built) Pavilions and the Assessment Items of CASBEE® for Temporary Construction

Please find in the following table the assessment items of CASBEE® for Temporary Construction (edition 2016) that are related to the Control and Guide Code provided in the “3-4. Consideration to the Environment” of the Guidelines.

CASBEE® for Temporary Construction Assessment (edition 2016) Items Related to the Guidelines

Control and Guide Code	Matters related to CASBEE® for Temporary Construction	Control and Guide Code	Matters related to CASBEE® for Temporary Construction
3-4-2. Energy and Global Environment			
C-23	LR1 “3. Efficiency in Building Service System	G-14	LR3 “1. Consideration of Global Warming”
G-15	LR1 “1. Building Thermal Load”*	G-16	LR1 “2. Natural Energy Utilization”*
G-17	LR1 “3. Efficiency in Building Service System	G-18	LR1 “4.1 Monitoring”*
G-19	LR2 “3.2 Avoidance of CFCs and Halons”	G-20	LR3 “2.1 Air Pollution”
3-4-3. Recycling Resources and Promoting 3R’s			
C-24	LR2 “2.3 Use of Recycled Materials as Structural Frame Materials”; “2.4 Use of Recycled Materials as Non-Structural Materials”	C-25	LR2 “2.6 Reusability of Components and Materials” (2.6.1-2.6.4)
		C-26	LR2 “1.1 Water Saving”
G-21	LR2 “2.7 Waste Minimization”	G-22	LR2 “2.6.6. Reuse of Exterior Materials”
G-23	LR2 “2.5 Timber from Sustainable Forestry”	G-24	LR2 “2.7 Waste Minimization”
G-25	LR2 “2.7 Waste Minimization”	G-26	LR2 “1.2.1 Rainwater Use System”
3-4-4. Protection against the Heat			
C-27	Q3 “3.2 Improvement of the Thermal Environment on Site”	G-27	LR3 “2.2 Heat Island Effect”
G-28	LR3 “2.2 Heat Island Effect”	G-29	Q3 “3.2 Improvement of the Thermal Environment on Site”
G-30	Q3 “3.2 Improvement of the Thermal Environment on Site”	-	-
3-4-5. Ventilation			
C-28	Q1 “4.2.1 Ventilation Rate”	-	-
3-4-6. Measurement			
C-29	LR1 “4.1 Monitoring”*	C-30	LR1 “4.1 Monitoring”*
G-31	LR2 “1.2.1 Rainwater Use System”	-	-

* Outside the scope of assessment if the construction is less than a year old.

1-2. Examples of Assessment Using CASBEE® for Temporary Construction

Please find below the examples of CASBEE® for Temporary Construction assessment using pavilion models with A- and S-rated environmental performance. Please check what measures are taken for the A-rated and S-rated models and consider introducing those measures for your facility.

1-2-1. Model Assessment Performed

<Information about the Model Pavilion>

- Location: Yumeshima Island, Konohana Ward, Osaka City, Osaka Prefecture
- Period of use: April - October 2025
- Plot area: 1,954.45 m² ■ Building area: 1,367.55 m² ■ Total floor area: 1,367.55 m²
- Number of stories & Structure: a ground-floor; steel ■ Purpose of the building: exhibition facilities

■ Average capacity: 342 people

<Tool Used>

- Assessment tool used: CASBEE® for Temporary Construction (edition 2016)

<Major Specs of the Model Pavilions and Recommended Measures>

	A-rated model	S-rated model	Related Control/Guide Code
Energy and Global Environment	$BEI^{TC} = 0.8^*$	$BEI^{TC} = 0.5^*$	C-23
	A widely-available type of heat insulation is used for the roof and exterior walls.* ²	Enhanced heat insulation is employed for the roof and exterior walls, and multilayer window glass* ² is used.	G-15
	Opening and closing windows are installed for natural ventilation.	Same as the left.	G-16
	An energy management system (EMS) is introduced.	Same as the left.	G-18
	Heat insulators with GWP less than 10 are employed.	Same as the left.	G-19
Recycling Resources and Promoting 3R's	Recycled resources are used.	Same as the left.	C-24
	Unit components are used, and some of them are re-usable.	Most of the frames, roof and exterior walls are re-usable.	C-25
	Standardized components are used for equipment and pipework.	Some parts of interior materials are re-usable. Same as the left; and the equipment and appliances are detachable.	
	A waste management plan is in place, and the management is operated as planned.	Same as the left.	G-21
	Relocatable pavement materials and blocks are used.	Same as the left; and plants are relocatable.	G-22
	Wood materials with a sustainability certificate are used.	Same as the left.	G-23
	Leased equipment are employed.	Same as the left.	G-25
	A water-saving machine is introduced.	Same as the left.	C-26
Protection against the Heat	Shade (pergola) is provided at the visitor queue area.	Same as the left.	C-27
	Artificial heat exhaustion at a general level is conducted.* ³	The amount of artificial heat exhaustion is controlled to a certain low level.* ³	G-27
	Preventive measures against pavement heating are taken.	Same as the left.	G-28
	Leafy trees are planted.	Same as the left.	G-29
	Mist spray machines are installed.	Same as the left.	G-30

Ventilation	A certain level of ventilation (30 m ³ /h/person) is conducted. Air inlet and outlet ports are placed at proper locations.	Same as the left.	C-28
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*BEI^{TC} is the BEI (Building Energy-efficiency Index) during a certain period of time (TC: Temporary Construction), and calculated by dividing the total amount of the Design Primary Energy Consumption during the period that is calculated through simulation, etc., by the total amount of the Standard Primary Energy Consumption during the period.

$$BEI^{TC} = \frac{\text{The total amount of the Design Primary Energy Consumption during the period}}{\text{The total amount of the Standard Primary Energy Consumption during the period}}$$

*2 Specs of the roof and exterior walls, etc., are as follows,

Item		A-rated model	S-rated model
Eaves		-	2.4 m
Glass at the opening		Single-layer glass, 12 mm	Multi-layer Low-E, 12+12+12
Roof thermal insulation	Specs	Styrene foam, 30 mm	Rigid urethane foam, 35 mm
	Coefficient of overall heat transmission [W/m ² *K]	0.97	0.76
Heat insulation for walls	Specs	Styrene foam, 20 mm	Composite-metal panel for heat insulation, 25 mm
	Coefficient of overall heat transmission [W/m ² *K]	1.53	0.78

*3. As BEI^{TC}, 0.8 was applied for the assessment of the A-rated model, 0.5 for the S-rated model.

1-2-2. Assessment Results

Please find in the table below the scores earned by the pavilion models for the environmental considerations. Please also find details about the A-rated model in the CASBEE® Score Sheet on the following page.

	BEE®	Q	Q1			Q2	Q3	LR	LR1	LR2	LR3
			Q1	Q2	Q3						
A-rated model	1.6	3.3	3.3	3.1	3.5	3.5	3.0	3.8	3.3		
S-rated model*	3.1	3.4	3.3	3.1	3.5	4.2	5.0	4.4	3.3		

* Assessment items earning higher levels because of enhanced specs compared with the A-rated model:

Q1-2.1.2: Level 3 -> Level 4; LR1-3: Level 3 -> Level 5; LR2-2.6.1~3: Level 4 -> Level 5; LR2-2.6.4: Level 3 -> Level 4; LR2-2.6.5~6: Level 4 -> Level 5

The Score Sheet of the CASBEE® for Temporary Construction Assessment (edition 2016) Software (Example of Entries for the A-rated Model)

Though the assessment software is available in Japanese, please refer to the following sheet as a supplementary explanation for the example of entries.

Score Sheet		Summary of environmentally conscious efforts in design		Entire Building and Common Properties		Residential and Accommodation sections		Total
Concerned categories				Score	weight	Score	weight	
Q Environmental Quality of the building								3.3
Q1 Indoor Environment					0.50			3.3
1 Noise & Acoustics				3.3	0.15			3.3
1.1 Noise		Not applicable for short-term use		3.0	-	3.0	-	
1.2 Sound Insulation				3.0	0.67			
1 Sound Insulation of Openings		FL12mm=T3		3.0	1.00	3.0	-	
2 Sound Insulation of Partition Walls				3.0	-	3.0	-	
3 Sound Insulation Performance of Floor Slabs (light-weight impact source)				3.0	-	3.0	-	
4 Sound Insulation Performance of Floor Slabs (heavy-weight impact source)				3.0	-	3.0	-	
1.3 Sound Absorption		Floor = flooring, walls, ceiling = gypsum board		4.0	0.33	3.0	-	
2 Thermal Comfort				3.0	0.35			3.0
2.1 Room Temperature Control				3.0	0.50			
1 Room Temperature Setting		Appropriate room temperature (26 degrees in summer) Not evaluated in winter		3.0	0.60	3.0	-	
2 Perimeter Performance		General insulation level		3.0	0.40	3.0	-	
3 Zoned Control		Exhibition facilities are not eligible		-	-	-	-	
2.2 Humidity Control		Appropriate humidity (50% in summer) Not evaluated in winter		3.0	0.20	3.0	-	
2.3 Type of Air Conditioning System		Supply / exhaust plan considering the temperature difference between the top and bottom		3.0	0.30	3.0	-	
3 Lighting & Illumination				3.0	0.25			3.0
3.1 Daylighting				-	-	-	-	
1 Daylight Factor		Exhibition facilities are not eligible		-	-	3.0	-	
2 Openings by Orientation				-	-	3.0	-	
3 Daylight Devices		Exhibition facilities are not eligible		-	-	3.0	-	
3.2 Anti-glare Measures				-	-	-	-	
1 Glare from Light Fixtures				-	-	-	-	
1 Daylight Control				3.0	-	3.0	-	
3.3 Illuminance Level		Exhibition facilities are not eligible		-	-	3.0	-	
3.4 Lighting Controllability		Can be adjusted with lighting control panels, fixtures, etc. (only in the exhibition room to be evaluated)		3.0	1.00	3.0	-	
4 Air Quality				4.0	0.25			4.0
4.1 Source Control				4.0	0.50			
1 Chemical Pollutants		F4★Compliant		4.0	1.00	3.0	-	
4.2 Ventilation				3.5	0.30			
1 Ventilation Rate		Secure 30m3 / h or more【C-28】		4.0	0.50	3.0	-	
2 Natural Ventilation Performance		Exhibition facilities are not eligible		-	-	3.0	-	
3 Consideration for Outside Air Intake		Distance between air supply port and exhaust port 3m or more		3.0	0.50	3.0	-	
4 Air Supply Planning				-	-	-	-	
4.3 Operation Plan				5.0	0.20			
1 CO2 Monitoring		CO2 monitor installed (to control air conditioning)		5.0	0.50	-	-	
2 Control of Smoking		Smoking cessation		5.0	0.50	-	-	

Q2 Quality of Service			-	0.15	-	-	3.1
1 Service Ability			3.1	0.75	-	-	3.1
1.1 Functionality & Usability			3.0	0.40	-	-	
1	Provision of Space & Storage		3.0	-	3.0	-	
2	Use of Advanced Information System		3.0	-	3.0	-	
3	Barrier-free Planning	Barrier-free new law level	3.0	1.00	-	-	
1.2 Amenity			3.0	0.30	-	-	
1	Perceived Spaciousness & Access to View		3.0	-	3.0	-	
2	Space for Refreshment		3.0	-	-	-	
3	Décor Planning	2 items applicable	3.0	1.00	-	-	
			100.0	-	-	-	
1.3 Maintenance Management			3.5	0.30	-	-	
1	Design Which Considers Maintenance Management	3 items applicable	3.0	0.50	-	-	
2	Securing Maintenance Management Functions	7 items applicable	4.0	0.50	-	-	
2 Durability & Reliability			3.0	0.25	-	-	3.0
2.1 Earthquake Resistance			3.0	0.90	-	-	
1	Earthquake-resistance	Equivalent to the Building Standards Act	3.0	1.00	-	-	
2	Seismic Isolation & Vibration Damping Systems		3.0	-	-	-	
2.2 Service Life of Components			-	-	-	-	
1	Service Life of Structural Frame Materials		3.0	-	-	-	
2	Necessary Refurbishment Interval for Exterior Finishes		3.0	-	-	-	
3	Necessary Renewal Interval for Main Interior Finishes		3.0	-	-	-	
4	Necessary Replacement Interval for Air Conditioning and Ventilation Ducts		3.0	-	-	-	
5	Necessary Renewal Interval for HVAC and Water Supply and Drainage Pipes		3.0	-	-	-	
6	Necessary Renewal Interval for Major Equipment and Services		3.0	-	-	-	
2.4 Reliability			3.0	0.10	-	-	
1	HVAC System		3.0	-	-	-	
2	Water Supply & Drainage		3.0	-	-	-	
3	Electrical Equipment		3.0	-	-	-	
4	Support Method of Machines & Ducts	Equivalent to seismic class B	3.0	1.00	-	-	
5	Communications & IT Equipment		3.0	-	-	-	
3 Flexibility & Adaptability		Not subject to evaluation	-	-	-	-	-
3.1 Spatial Margin			-	-	-	-	
1	Allowance for Floor-to-floor Height		3.0	-	3.0	-	
2	Adaptability of Floor Layout		3.0	-	3.0	-	
3.2 Floor Load Margin			3.0	-	3.0	-	
3.3 Adaptability of Facilities			-	-	-	-	
1	Ease of Air Conditioning Duct Renewal		3.0	-	-	-	
2	Ease of Water Supply and Drain Pipe Renewal		3.0	-	-	-	
3	Ease of Electrical Wiring Renewal		3.0	-	-	-	
4	Ease of Communications Cable Renewal		3.0	-	-	-	
5	Ease of Equipment Renewal		3.0	-	-	-	
6	Provision of Backup Space		3.0	-	-	-	

Q3 Outdoor Environment on Site				—	0.35	-	-	3.5
1 Preservation & Creation of Biotope			7 points. A planting plan that takes into consideration native species.	3.0	0.30	-	-	3.0
2 Townscape & Landscape			4 points. Consideration was given according to the plan of the entire venue.	4.0	0.40	-	-	4.0
3 Local Characteristics & Outdoor Amenity				3.5	0.30	-	-	3.5
3.1 Attention to Local Charcter & Improvement of Comfort			2 points.	3.0	0.50	-	-	
3.2 Improvement of the Thermal Environment on Site			13 points. Mist, planting, pergola installation. Outer wall recursive finish.【C-27】【G-29,G-30】	4.0	0.50	-	-	
LR Environmental Load Reduction of the building					-	-	-	3.5
LR1 EEnergy				—	0.20	-	-	3.0
1 Building Thermal Load			[U] = 0.97(roof) /1.53(outer wall) /6.51(window) 【G-15】	-	-	-	-	-
2 Natural Energy Utilization			Open / close window for natural ventilation (night purge)	-	-	-	-	-
3 Efficiency in Building Service System			[BEI][BEIm] = 0.8 Lighting fittings(under the Top Runner Program)【C-23】	3.0	1.00	-	-	3.0
4 Efficient Operation				-	-	-	-	-
Other than apartments				-	-	-	-	
4.1 Monitoring			Introduced energy management system (EMS). 【G-18】 No fuel other than renewable energy and supply. 【C-29,C-30】	-	-	-	-	
4.2 Operation & Management System				-	-	-	-	
Apartments				-	-	-	-	
4.1 Monitoring			—	3.0	-	-	-	
4.2 Operation & Management System			—	3.0	-	-	-	
LR2 Resources & Materials				—	0.50	-	-	3.8
1 Water Resources				3.4	0.10	-	-	3.4
1.1 Water Saving			All water-saving equipment【C-26】	4.0	0.40	-	-	
1.2 Rainwater & Gray Water				3.0	0.60	-	-	
1 Rainwater Use System			No Rainwater Use System【G-26,G-31】	3.0	0.70	-	-	
2 Gray Water Reuse System				3.0	0.30	-	-	
2 Reducing Usage of Non-renewable Resources				3.9	0.85	-	-	3.9
2.1 Reducing Usage of Materials				3.0	-	-	-	
2.2 Continuing Use of Existing Building Skeleton etc				3.0	-	-	-	
2.3 Use of Recycled Materials as Structural Frame Materials			Adopted for foundation (crushed stone, etc.) 【C-24】	5.0	0.07	-	-	
2.4 Use of Recycled Materials as Non-structural Materials			Used for gypsum board and flooring 【C-24】	4.0	0.04	-	-	
2.5 Timber from Sustainable Forestry			10% adoption rate of certified materials 【G-23】	4.0	0.04	-	-	
2.6 Reusability of Components and Materials				3.8	0.65	-	-	
1 Recycling and reuse of the skeleton			Use of unit members (reusable) 【C-25】	4.0	0.25	-	-	
2 Recycling and reuse of roofing materials			Same as above【C-25】	4.0	0.15	-	-	
3 Recycling and reuse of exterior wall materials			Same as above【C-25】	4.0	0.15	-	-	
4 Recycling and reuse of interior materials			Wood flooring【C-25】	3.0	0.15	-	-	
5 Recycling and reuse of equipment			Applicable to 3 items (Piping / air conditioner standardization, easy-to-replace equipment)	4.0	0.15	-	-	
6 Reuse of exterior materials			2 items applicable (removable pavement material, planting block)【G-22】	4.0	0.15	-	-	
2.7 Waste minimization			2 items applicable (3R management plan formulation, adoption of rental equipment) 【G-21,G-24,G-25】	4.0	0.20	-	-	
3 Avoiding the Use of Materials with Pollutant Content				3.6	0.05	-	-	3.6
3.1 Use of Materials without Harmful Substances			1 item applicable (painting agent)	4.0	0.30	-	-	
3.2 Avoidance of CFCs and Halons				3.5	0.70	-	-	
1 Fire Retardant			Substitute with an outdoor fire hydrant (fire extinguisher) 【G-19】	-	-	-	-	
2 Insulation Materials			Metal insulated sandwich panel (ODP=0、GWP= < 3) 【G-19】	4.0	0.50	-	-	
3 Refrigerants			ODP=0【G-19】	3.0	0.50	-	-	

LR3 Off-site Environment			—	0.30	-	-	3.3
1 Consideration of Global Warming			3.0	0.33	-	-	3.0
2 Consideration of Local Environment			4.0	0.33	-	-	4.0
2.1	Air Pollution	Do not use combustion equipment.【G-20】	5.0	0.25	-	-	
2.2	Heat Island Effect	16 points. Highly reflective finish on roofs and outer walls. Preliminary survey conducted. Greening and water retention pavement. 【G-27,G-28】	4.0	0.50	-	-	
2.3	Load on Local Infrastructure		3.0	0.25	-	-	
1	Reduction of Rainwater Discharge Loads	General standards of laws and regulations	3.0	0.25	-	-	
2	Sewage Load Suppression	Same as above	3.0	0.25	-	-	
3	Traffic Load Control	Follow the plan for the entire venue.	3.0	0.25	-	-	
4	Waste Treatment Loads	Follow the plan for the entire venue.	3.0	0.25	-	-	
3 Consideration of Surrounding Environment			3.0	0.33	-	-	3.0
3.1	Noise, Vibration & Odor		3.0	0.40	-	-	
1	Noise	Not subject to regulation	3.0	1.00	-	-	
2	Vibration	Same as above	-	-	-	-	
3	Odor	Same as above	-	-	-	-	
3.2	Wind Damage & Sunlight Obstruction		3.0	0.40	-	-	
1	Restriction of Wind Damage	Since it is a low-rise building, it was set to level 3.	3.0	0.70	-	-	
2	Restriction of Sand and Dust		3.0	-	-	-	
3	Restriction of sunlight obstruction	Not subject to regulation	3.0	0.30	-	-	
3.3	Light Pollution		3.0	0.20	-	-	
1	Outdoor Illumination and Light that Spills from Interiors	General approach level	3.0	0.70	-	-	
2	Measures for Reflected Solar Glare from Building Walls	Same as above	3.0	0.30	-	-	

1-3. Matters to Remember in Creating the “Environmental Plan”

After filling out the EXCEL file sheets of CASBEE® for Temporary Construction, please submit the EXCEL file to the designated portal website of Japan Association for the 2025 World Exposition as your “Environmental Performance Plan.” (See “5-2. Step-Two Submission of Documents”, the Guidelines.) When filling out the EXCEL file sheets of CASBEE® for Temporary Construction (edition 2016)-, please keep in mind the following.

- Describe in the section of “Summary of environmentally conscious efforts in design” of the Score Sheet the initiatives or measures taken or to be taken to meet the Control/Guide Code of the Guidelines. Please refer to the previous pages, “The Score Sheet of the CASBEE® for Temporary Construction Assessment (edition 2016) Software (Example of Entries for the A-rated Model) and the next page, “Environmental Considerations, etc., to be Described in the Score Sheet”, when describing the initiatives/measures. If you need not or are not going to take a measure to meet the Control Code (C23 – C30), remember to provide the reason. (e.g., “Cannot find the applicable equipment meeting the Control Code.”). Please describe if you have any initiatives or measures to meet the Guide Code (G11 – G31).
- You need not get your assessment results certified* by a third-party organization; however, it is desirable that assessment is carried out by those who are licensed as CASBEE® Accredited Professionals for Buildings (accredited evaluators).*2.

* The “CASBEE® Certification System” is administered by IBEC to provide third-party auditing and certification to assessment results.

*2 The “CASBEE® Accredited Professional (CASBEE-AP) Registration System Auditor Registration Program” is administered by IBEC to license qualified persons to audit CASBEE® assessment results. Registered accredited professionals practice at design offices and construction companies nationwide.

Environmental Considerations, etc., to be Described in the Score Sheet

Control and Guide Code	Matters related to CASBEE® for Temporary Construction (edition 2016)	Environmental considerations, etc., that need to be input in the Score Sheet**
3-4-2. Energy and Global Environment		
C-23	LR1 “3. Efficiency in Building Service System	Equipment/Appliances under the Top Runner Program
G-14	LR3 “1. Consideration of Global Warming”	The description of the initiative implemented for carbon offsetting, etc.
G-15	LR1 “1. Building Thermal Load”*	Specs or performance values (coefficient of overall heat transmission [W/m ² K], etc.) per building skin area.
G-16	LR1 “2. Natural Energy Utilization”*	Method employed to use natural energies.
G-17	LR1 “3. Efficiency in Building Service System	Renewable energy system introduced (its type, equipment performance, etc.).
G-18	LR1 “4.1 Monitoring”*	The description of the BEMS, etc., introduced.
G-19	LR2 “3.2 Avoidance of CFCs and Halons”	The specs of the heat insulator and refrigerant employed (ODP, GWP).
G-20	LR3 “2.1 Air Pollution”	The type of the burning appliance installed and its exhaust specs.
3-4-3. Recycling Resources and Promoting 3R’s		
C-24	LR2 “2.3 Use of Recycled Materials as Structural Frame Materials” “2.4 Utilization of Recycled Materials for Parts Other than Building Frames”	The names of the recycled materials employed.
C-25	LR2 “2.6 Reusability of Components and Materials” (2.6.1-2.6.4)	The description of the method, etc., employed to demolish and separate resources.
C-26	LR2 “1.1 Water Saving”	The description of the water-saving sanitary appliance employed.
G-21	LR2 “2.7 Waste Minimization”	Method employed to reuse materials and equipment.
G-22	LR2 “2.6.6. Reuse of Exterior Materials”	Method employed to reuse outdoor structures and plant trees.
G-23	LR2 “2.5 Timber from Sustainable Forestry”	Sustainability-oriented materials employed. (The names of the materials, the ratio of the materials, etc.)
G-24	LR2 “2.7 Waste Minimization”	Raw materials and materials avoided. (The names of the materials, etc.)
G-25	LR2 “2.7 Waste Minimization”	Equipment/appliances leased or rented. (The types of the equipment, etc.)
G-26	LR2 “1.2.1 Rainwater Use System”	Rainwater utilization equipment introduced. (The type, performance, etc., of the equipment.)
3-4-4. Protection against the Heat		
C-27	Q3 “3.2 Improvement of the Thermal Environment on Site”	Measures implemented to protect against solar radiation. (The types, locations, scales, etc., of the measures.)
G-27	LR3 “2.2 Heat Island Effect”	Measures implemented to exhaust heat. (The types, locations, scales, etc., of the measures.)
G-28	LR3 “2.2 Heat Island Effect”	Measures implemented to protect against the heat on ground surface. (The types, locations, scales, etc., of the measures.)
G-29	Q3 “3.2 Improvement of the Thermal Environment on Site”	Greening measures implemented to protect against the heat. (The types, locations, scales, etc., of the measures.)
G-30	Q3 “3.2 Improvement of the Thermal Environment on Site”	Water-spraying or other measures similar in kind implemented to protect against the heat (the

		types, locations, scales, etc., of the measures.)
3-4-5. Ventilation		
C-28	Q1 “4.2.1 Ventilation Rate”	Designed ventilation volume [m ³ /person*h], etc.
3-4-6. Measurement		
C-29	LR1 “4.1 Monitoring”*	Items of measurement (e.g., “the measurement of consumed propane gas”).
C-30	LR1 “4.1 Monitoring”*	Items of measurement (e.g., “the measurement of generated solar energy”).
G-31	LR2 “1.2.1 Rainwater Use System”	Items of measurement (e.g. “the measurement of utilized rainwater”).

* Outside the scope of assessment if the construction is less than a year old.

** Use the “Considerations in environmental design” sheet if you cannot input all necessary information on the Score Sheet.

2) Energy and Global Environment

2-1. Top Runner Program

<C-23>

The Top Runner Program is based on the “Act on Temporary Measures for Promotion of Rational Uses of Energy and Recycled Resources in Business Activities (Energy Saving Act)” and designed to encourage the makers and importers of equipment, appliances and building materials to improve their products’ energy consumption efficiency by specifying standard energy consumption efficiency levels and requesting the makers and importers to display their products’ energy consumption efficiency. For more information about the Program, including its scope and the standard energy consumption efficiency levels set for air conditioners, lighting fittings and other equipment, appliances, etc., please refer to the website of the Agency for Natural Resources and Energy of Japan’s Ministry of Economy, Trade and Industry.

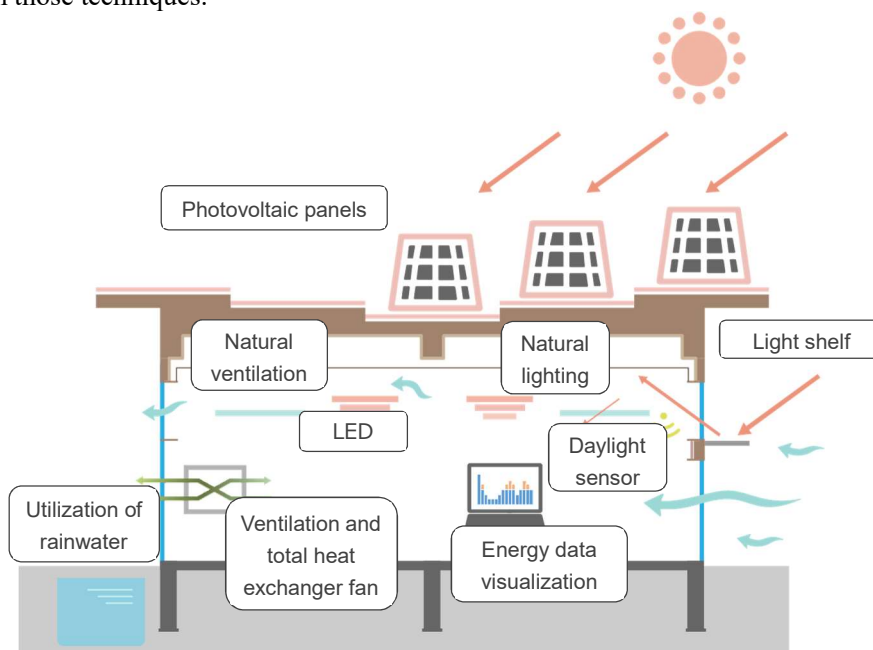
https://www.enecho.meti.go.jp/category/saving_and_new/saving/enterprise/equipment/ (in Japanese)

Please find in the table below the items of goods subject to the Program (excluding cars; as of February 2021).

Air conditioners	Gas cooking appliances	Switching equipment
Lighting fittings	Gas water heaters	Multi-function copier/printers
Television receivers	Oil water heaters	Printers
Copiers	Electric heated toilet seats	Heat pump water heaters
Computers	Automatic vending machines	AC motors
Magnetic disk devices	Electric transformers	Electric bulbs
Video tape recorders	Electric rice cookers	Showcases
Electric refrigerators	Microwave ovens	Heat insulators
Electric freezers	DVD recorders	Sashes
Stoves	Routing equipment	Multilayer window glass

2-2. Energy-Saving Techniques

Please find below some of the architectural, electrical and mechanical techniques you should perhaps consider using to make your pavilion energy-efficient. You would probably find books* about the energy-saving and other effects you can expect from those techniques.



Example of a Pavilion with High Energy Efficiency

* “Energy-saving Design Techniques for Architecture --- Preparing for Compliance with the Energy Saving Act”, authored by the editorial committee for “Energy-saving Design Techniques for Architecture” and supervised by the Osaka Prefectural government, 2017

2-2-1. Controlling Thermal Load on Building Skins

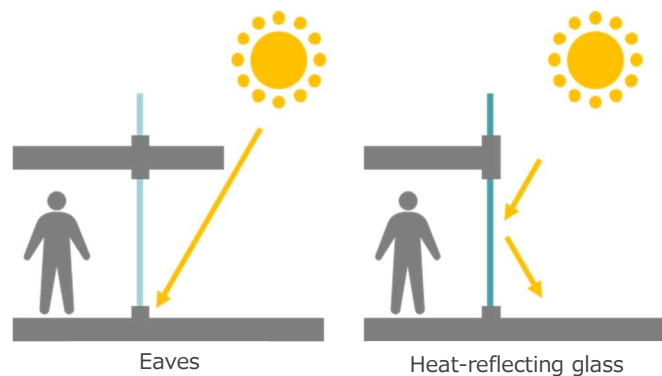
<G-15>

● Pavilion's Placement and Configuration

You should design your pavilion in such a manner that the dimensions of its exterior wall will be as minimal as possible (a planar shape similar to a square) to reduce the loss of heat from the building skin. The projective area between the eastern and western sides receiving a higher amount of solar radiation than other external wall surfaces should have as small dimensions as possible. You would also find it effective to place a non-air-conditioned room between the eastern and western sides as a heat buffer zone.

● Solar Shading (Trees, eaves, louvers, exterior blind, etc.), Heat Insulation and Heat Shielding

You should consider using fixtures to adjust the amount of incoming solar radiation, such as eaves, louvers and blind, with consideration to the solar radiation characteristics that depend on the orientation of windows. You should also consider using heat-absorbing or heat-reflecting glass to control the amount of solar radiation heat from the building skin. Since the Expo takes place in a season requiring no heat, there would be no need to employ window glass with high insulation properties; however, you should consider employing multilayer or low-emissivity glass, or otherwise insulated- or double-window sashes, in order to reduce the loss of heat. Minimizing the size of windows would also be effective.



● Thermally Insulating or Shielding the Roof (through High Solar Reflection, Roof Greening, etc.)

You should consider thermally insulating the roof and ceiling and coating the roof surface with a high-reflection paint. You will also find it effective to plant leafy trees or install a pergola on the roof floor in preventing the roof frame's temperature from rising due to direct solar radiation.

● Greening the Exterior Walls

Greening exterior walls serves as a means to shade solar radiation. In fact, greening exterior walls is effective not only in shading solar radiation, but also in preventing outdoor air temperatures from excessively rising through the transpiration from the plants. Greening exterior walls will also help reduce CO₂ as the plants will absorb it, and will also mitigate heat island effects.

In greening your exterior walls, you should know the characteristics of the locations (e.g., the influence of solar radiation and wind) so that you can select and install the most proper plants for the exterior walls with an appropriate greening method (including the choice of soil and supplements, installation style, and consideration to the load on the walls).

2-2-2. Utilization of Natural Energies

<G-16>

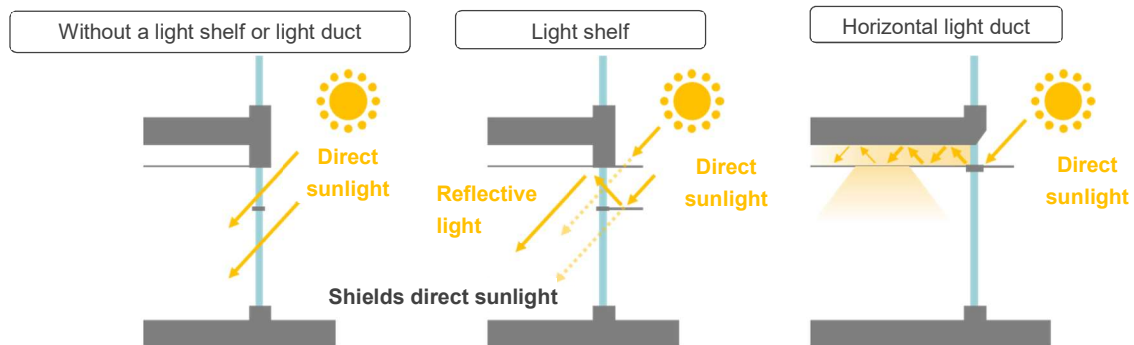
● Using a Natural Ventilation System

You will find a natural ventilation system highly effective during the spring and autumn. A natural ventilation system does not require the use of electricity for running the motor; it uses, for instance, the pressure of the wind on the building, the chimney effect generated through the difference of temperatures, and the Venturi (inducement) effect making use of prevailing winds.

● Harvesting Natural Lighting

You can raise the utilization ratio of daylight by making windows large to the extent that they will not lose the insulation capacity. Installing a light shelf (See the next page) is a typical method to harvest daylight. A light shelf is designed to reflect sunlight on the ceiling by placing it at the border between the upper and lower parts of the window and making use of the upper part of the window to take in sunlight while the lower part to provide a view

from the room. The sunlight reflected by the upper surface of the shelf onto the ceiling increases the luminance at the ceiling near the window and enhances the brightness in the room. If a room is elongated, you may find it effective to use a light duct (See the next page) in order to guide the sunlight harvested through the duct tube at the rooftop into the room and make it radiate across the room.



● Controlling Daylight to Reduce Energy Consumption by Artificial Lighting

Using a daylight sensor-controller will help you optimize the lighting environment in the room, all the while making the best use of natural daylight and saving energy consumption by artificial lighting. A daylight sensor-controller adjusts the ratio of light output from artificial lighting depending on the illumination in the room attained from natural daylight. Therefore, if you use a daylight sensor-controller in an elongated room, you would need to build the sensor circuit separately for the part of the room receiving less daylight and for the part receiving daylight. Meanwhile, you can raise the energy saving efficiency by setting the light output from artificial lighting low for the part receiving a lot of daylight.

2-2-3. Renewable Energy Systems

<G-17>

● Solar Power Generation Systems

Solar power generation systems have gained more and more popularity inside and outside Japan as conversion rates have increased and as prices have declined. Using a solar power generation system will help you save energy consumption and reduce power costs especially in Osaka, where the amount of solar radiation is high all year round. You will also find it easy to harmonize a solar power generation system with the design of your pavilion because the system is available in various forms, such as a built-in type with the roof or exterior wall and a see-through type, besides the conventional rooftop-mounted one. Before installing a solar power generation system of any type, you should take into consideration the shade or light reflection that will be generated by the system on its surroundings.

● Wind Power Generation Systems

Wind power generation systems allow you to generate power all day as long as a wind of a certain speed is available. You can find a small-scale wind power generation system that works with a light wind and can be mounted on a rooftop, square, etc. There may be cases where winds are shielded by buildings in the vicinity of your pavilion, and hence you should give sufficient consideration to the location and height of installation. As for wind speeds and directions at the Expo site, please see 4-1. Climate at the Expo Site.

2-2-4. Raising the Energy Efficiency of Equipment and Systems

<C-23>

● Using Highly-Efficient Instruments (e.g., LED and OLED instruments)

Using LED and other highly-efficient instruments will help you reduce energy consumption.

● Task and Ambient Lighting

You can also reduce energy consumption by changing the level of illumination depending on whether it is illuminating a showpiece, commodity, writing table, etc., or the rest part of the room (and lowering the level of illumination for the rest part of the room). Installing both task and ambient lighting fixtures and using either of them depending on the situation will also help you reduce energy consumption.

● Sensor-Controlling Room Illuminance Levels

Using an auto brightness sensor will allow you to save energy consumption as it automatically dims lighting to an appropriate level.

- **Human Detecting Sensors**

By installing a human detecting sensor in the water closet, changing room, storage room, staff kitchen, corridors, and other rooms or areas where no or little illumination is necessary in the absence of a person, you can save some energy consumption as the gadget automatically turns off or dims the light when there is nobody in the room/area.

- **Regenerative Power System**

Using a regenerative power system, which regenerates the electricity used to drive an elevator, and making use of the regenerated power in the pavilion will help you reduce energy consumption.

- **Highly-Efficient Air Conditioners and Ventilators**

In order to save energy consumption, you should perhaps use an air conditioner or ventilation fan which has a highly-efficient motor. If you install a packaged air conditioner, you should perhaps choose an inverter type because it is highly-efficient. Using a human flow sensor or other similar ICT technology in combination with such highly-efficiency air conditioners and ventilators will enhance your energy saving potential.

- **Desiccant (Sensible and Latent Heat Separation) Air Conditioning**

As opposed to the conventional air conditioning method with which air is dehumidified by treating sensible and latent heat in an integrated manner, the desiccant method treats sensible and latent heat separately. Therefore, using a desiccant-method air conditioner increase the number of instruments, but it controls temperature and humidity more efficiently than the other and will help you spend the summer more comfortably all the while saving energy consumption.

- **Controlling the Intake of Outdoor Air**

Elevation in the intake of outdoor air leads into an increase in energy consumption except for the time of outdoor air cooling. By using a system which controls the load from outdoor air by reducing the intake of outdoor air at the time of warming-up and pulling-down, regulating CO₂ levels and monitoring human flow through the use of the ITV technology, you can reduce your pavilion's energy consumption.

- **Total Heat Exchanger**

A total heat exchanger reduces the thermal load of outdoor air by performing heat exchange between incoming and outgoing air. When the outdoor temperature is moderate, however, it is more desirable that outdoor air is taken in rather than treated with heat exchange. Therefore, you should perhaps choose a total heat exchanger equipped with a switch that will automatically change the operation mode to the bypass mode depending on the outdoor air temperature.

2-3. Osaka Prefecture's Green Procurement Policy

<G-19,C-24,C-26>

The "Osaka Prefecture's Green Procurement Policy" has been established by the Osaka Prefectural government. Through the Policy, the Osaka Prefectural government has promoted its staff to buy and use eco-friendly or recycled goods as well as encouraged private-sector businesses to follow suit. The guidelines and the list of goods subject to the Policy are made available to the public.

<http://www.pref.osaka.lg.jp/chikyukankyo/jigyotoppage/greenhotatsu.html> (in Japanese)

2-4. Recommended Guidelines on the Control of Nitrogen Oxide Emissions

<G-20>

For the aim of reducing nitrogen oxide emissions from small burners, the Ministry of the Environment of Japan stipulates recommended criteria concerning burners and nitrogen oxide emissions in the "Recommended Guidelines on Low NOx-type Small Burners."

<https://www.env.go.jp/air/osen/shokibo/index.html> (in Japanese)

For the aim of reducing nitrogen oxide emissions from soot/smoke-producing facilities, the Osaka Prefectural government stipulates recommended criteria concerning the installation and operation of such facilities (and their burning equipment) and the emissions of nitrogen oxide by those facilities, etc., in the "Recommended Guidelines towards the Reduction of NOx Emissions in Osaka Prefecture."

<http://www.pref.osaka.lg.jp/jigyoshoshido/taiki/guideline.html> (in Japanese)

3) Recycling Resources and Promoting 3R's

3-1. List of the Osaka Prefecture Certified Recycled Products Program and other Environmental Labelling Programs

<C-24,C-25,C-26,G-24>

Programs	Operating organizations	Products with the markings/labels
Osaka Prefecture Marking Program for Certified Recycled Products http://www.pref.osaka.lg.jp/shigenjunkan/recycle-products/ (in Japanese)	Osaka Prefecture	Products in various sectors (including: exterior construction materials; aggregates; wood flooring products)
Eco Mark https://www.ecomark.jp/search/search.php (in Japanese)	Japan Environment Association (a public interest incorporated foundation)	Products in a wide range of sectors (including: materials for interior and exterior design; civil engineering and exterior construction materials; water-saving appliances)
Marking program for PET Bottle Recycling http://www.petbottle-rec.gr.jp/product/ (in Japanese)	The Council for PET Bottle Recycling	Products recycled from plastic bottles (e.g., civil engineering and building materials)
Marking program for timber from forest thinning http://www.zenmori.org/kanbatsu/mark/ (in Japanese)	National Federation of Forest Owners' Co-operative Association	Products made from timber harvested from forest thinning (e.g., office furniture, materials)

3-2. Construction Recycling Promotion Plan 2020

<G-21>

The Ministry of Land, Infrastructure, Transport and Tourism of Japan has regularly announced a construction recycling promotion plan aimed at promoting the recycling of construction products and the proper treatment of construction by-products. As recycling has become prevalent, the Ministry is trying to take the initiative to a next level by placing an emphasis on resource recovery and re-use. The Plan provides information, such as the resource recovery rates and disposal rates of construction waste in Japan, and you would find the Plan useful as a reference for target setting.

<https://www.mlit.go.jp/report/press/content/001365044.pdf> (in Japanese)

3-3. Making Sure the Legality of Your Timber or other Wood Materials

<G-23>

The use of wood harvested from sustainable forests has been encouraged through the “Act on Promoting the Distribution and Use of Legally Harvested Wood and Wood Products (the so-called Greenwood Act)” of Japan. Please go to the link below to find details about the Act, how to check the conformity of your timber or other wood materials with the basic policies of the Act, a list of certification programs, etc.

<https://www.rinya.maff.go.jp/j/riyou/goho/summary/summary.html> (in Japanese)

3-4. Real-Life Example of Building Re-Use

<G-21>

The Expo 2005 building comprised of several pavilions (modules) and named “Global Common” has been reused. Each module, measuring 18 m x 18 m and standing nine meters tall and built with steel frames, was so designed for the future reuse as a storeroom. Nine of the modules have been reused as a furniture factory, two as a metal-coating factory and two as a metal-processing factory in Aichi Prefecture, and 18 as a plant in Seto City. In fact, many interior and exterior materials as well as exhibits for the Expo 2005 were handed over to new owners after the event was closed.



Modular building at Expo
2005 Aichi, Japan
©GISPRI

4) Protection against the Heat

4-1. Climate at the Expo Site

Please find below the outdoor temperatures, humidity levels and amounts of solar radiation in the vicinity of Yumeshima Island during the period from April to October, where and when the Expo will take place. The highest outdoor temperature recorded was 37 degrees Celsius at 15:00 in August, while the lowest at 4.2 degrees Celsius at 6:00 in April. Humidity tends to be relatively high all year round. There are more sunny days than cloudy days, and the amount of solar radiation is high, while the amount of precipitation is low.

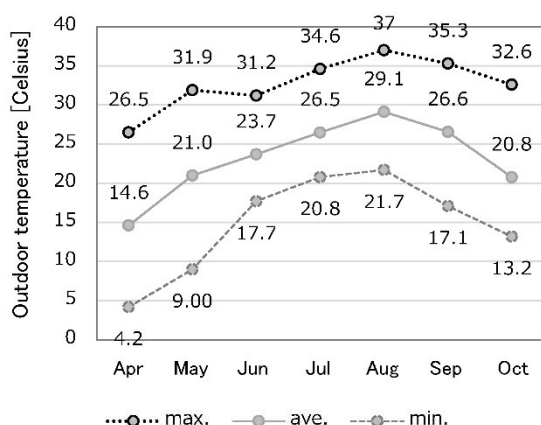
<Sources> Outdoor temperatures (on Kansai International Airport Island): Data published by Japan Meteorological Agency

Outdoor humidity levels and the amounts of solar radiation and precipitation (in Osaka City): Data published by Japan Meteorological Agency

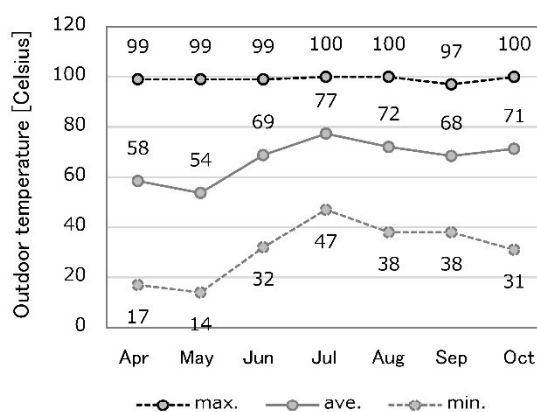
Wind directions and speeds: measured at the Expo 2025 site

Sea water temperatures (the estuary of Yodogawa River): data obtained with a fixed-point sea-quality observation system installed in Osaka Bay and distributed by the Ministry of Land, Infrastructure, Transport and Tourism

■ Outdoor temperatures Y2019

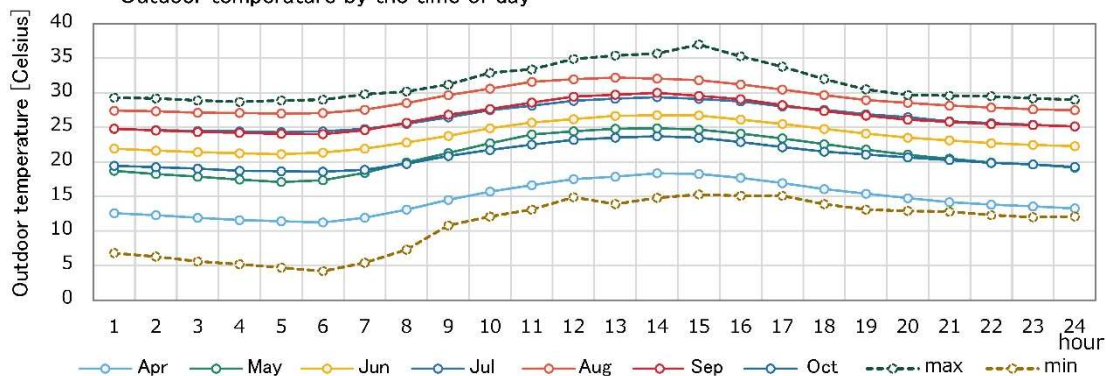


■ Outdoor humidity levels Y2019

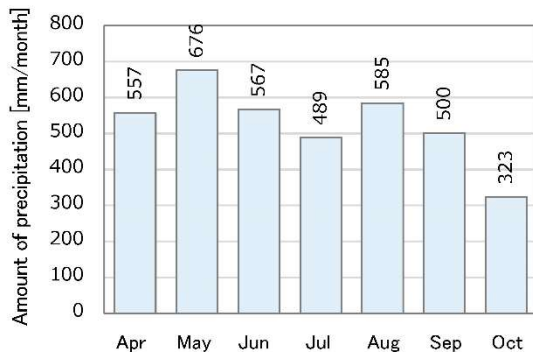


■ Outdoor temperatures Y2019

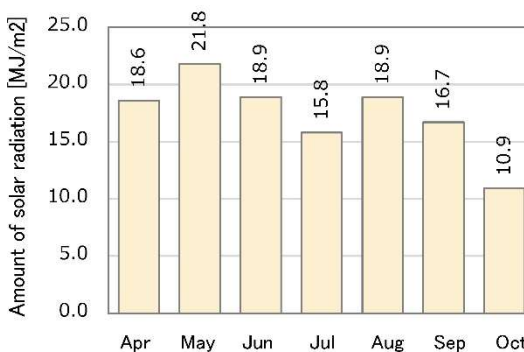
Outdoor temperature by the time of day



■ Amounts of precipitation Y2019

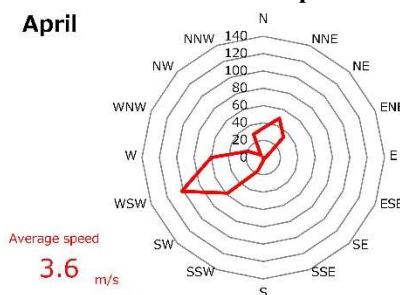


■ Total solar radiation Y2019

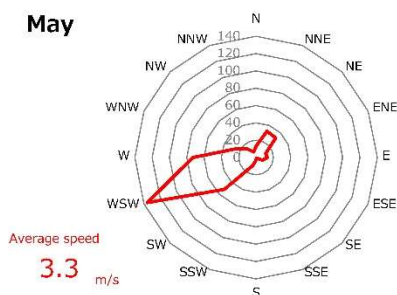


■ Wind Directions and Speeds 09:00 - 22:00 in 2020

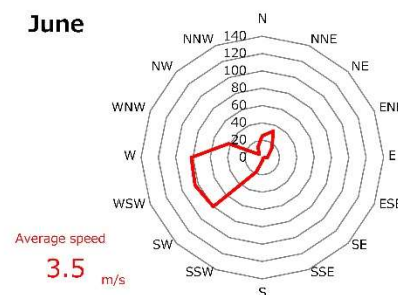
April



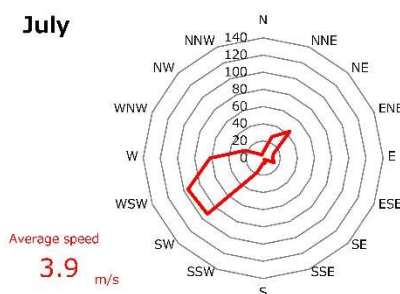
May



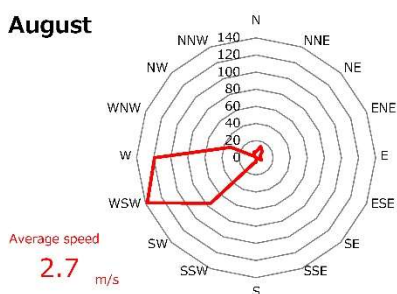
June



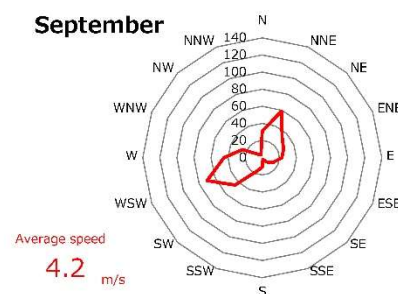
July



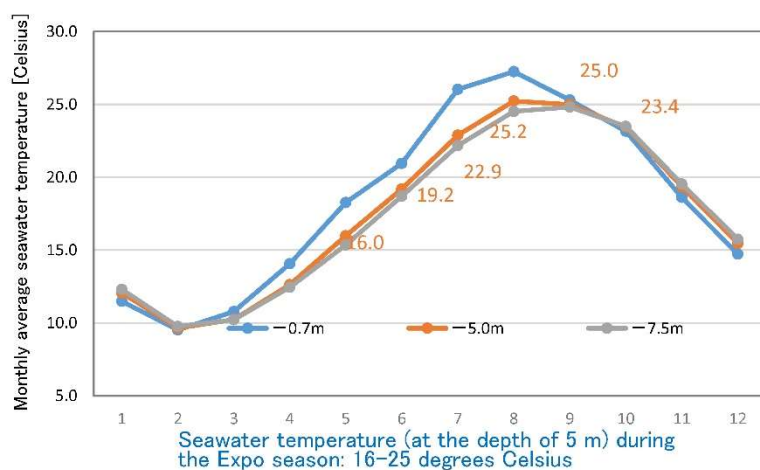
August



September



■ Seawater temperatures Average for 2016-2018



■ Stations of Observation by Japan Meteorological Agency

Observation point	Location	Latitude & Longitude	Height above sea level
Kansai International Airport Island	Kansai Aviation Weather Service Center, Senshu-kuko-naka, Tajiri-cho, Sennan-gun, Osaka Prefecture	34°40'9"N 135°31'1"E	5 m
Osaka	Osaka District Meteorological Observatory, Otemae, Chuo-ku, Osaka City	34°26' 0"N 135°13'9"E	23 m
Yodogawa River's estuary	Offshore of Osaka Bay	34°39'41"N 135°22'2"E	-11 m

4-2. Protective Measures against Summer Heat

<C-27,G-28,G-29,G-30>

You would perhaps find useful the following guidelines issued by the Ministry of the Environment of Japan concerning protective measures against summer heat in urban areas and preventive measures against heatstroke during summer events.

“Guidelines on Protective Measures against Summer Heat in Urban Areas”

https://www.wbgt.env.go.jp/doc_city_guideline.php (in Japanese)

“Guidelines on Preventive Measures against Heatstroke during Summer Events (Edition 2020)”

https://www.wbgt.env.go.jp/heatillness_gline.php (in Japanese)