Mini-Workshop on ILC Infrastructure and CFS
for Physics and Detectors Study

Campus

2016.03.15

Tokiko Onuki/Tohoku University

1.Main Campus

- fundamental plan
- site location
- schedule
- facilities

2.IP campus

- schedule
- site volume and facilities

ILC main campus- Fundamental Plan

Tohoku university is making the draft of campus fundamental plan in close communication with KEK .

Fundamental concept

- **Connect to the world**
- **Open to the public**
- **Consider rich natural environment**
- **Good transportation system for ILC and public**
- **Safety and security campus**

Fundamental Plan

- environmental plan
- opened campus plan
- zoning and facility plan
- welfare facilities plan
- housing plan
- transportation plan
- infrastructure plan

ILC main campus- location requirement

KEK report Study of the ILC Project Infrastructure Design Guidelines
(February 2014)

・Within 30-40minutes from existing urban area and IP(p. II -4)

the ILC candidate site evaluation in Japan

・within 30km from IP(p.164)

・about 50ha in one place at the first stage, and 50ha as future expansion within 15km from the first stage area (total 100ha)(p.164)

・accessibility between the main transportation hub, rich public transportation system(p.165)

for Kitakami site

・strongly recommend a location near the Shinkansen station which is superior in a study, living environment by having accessibility to Sendai, Tokyo(p.344)

→Considering these requirements, the Kitakami site starts to identify a final candidate site of main campus.

ILC main campus

necessary to do these to make the main campus (also IP campus)

■legal procedures

- Urban Planning
  - development permission(by local city) ≧1ha
- Agricultural Land Act
- Forest Act, …

■environmental assessment (Iwate prefecture)

- necessary for the land development project ≧50ha

■site acquisition arrangement

■site development

- basic & detail design
- site development

■building construction

- basic & detail design
- construction

<u>mainly by the local area (outside of campus)</u>

■surrounding infrastructure (water supply and drainage,electricity, …)

- basic & detail design　- construction

ILC main campus Schedule- case study

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Tohoku University Aobayama New campus																				
environmental assessment									4years Research & Conservation Plan					Post-project survey						
site acquisition arrangement																				
site development	Basic survey and plan by campus planning office									Basic & Detail design				Development(staged development continuing) sep'09 start						
building construction										Basic & Detail design		Detail design		0.5years Construction(staged construction continuing)		Detail design				★mar'10first building completion
Kyushu University Ito campus																				
environmental assessment				6years Research & Conservation Plan						Post-project survey										
site acquisition arrangement																				
site development										2years Basic & Detail design	Development(staged development continuing)									
building construction											Basic design	Detail design(each building detail design continuing)								
													Construction(staged construction continuing)							
															★oct.2005 open the campus					
																				(5years after from the beginning of development)
OIST																				
environmental assessment																				
site acquisition arrangement																				
site development																				
building construction																				

ILC main campus-Schedule(Draft)

main critical point is environmental assessment.

	Pre Preparatory Phase		Preparatory Phase				Construction Phase										
	1	2	1	2	3	4	1	2	3	4	5	6	7	8	9	10	11
legal procedures	by local Pre study		Consultation with local government														
environmental assessment	by local Pre survey		5years→or shorter? Research & Conservation Plan				Post-project survey (depends on the development)										
site acquisition arrangement	by local Land survey & arrangement																
site development (includes infrastructure)	by local&ILC Pre study		Basic & Detail design				Development(depends on the site condition)										
building construction	Pre study by local&ILC		Basic design				Detail design			start from the usable place staged Construction(depends on site development) ★the first building will be completed (depends on the volume & function)							
surrounding infrastructure (outside of campus)	Pre study by local		Basic & Detail design by local				by local Development(depends on the site condition)										

※all include the contract procedure

ILC main campus-facilities(Draft)

based on the KEK report Study of the ILC Project Infrastructure Design Guidelines (February 2014)

Until the end of construction phase, those facilities will be constructed.

(also in the operation phase, the construction will be continuing.)

■Office

Finally

Office for researcher : rooms for 1,200people (7～20㎡/person)→1,600people

Office for technical staff : rooms for 350people (7～10㎡/person)

Office for management staff : rooms for 150people (7㎡/person)

+multipurpose space(for temporary office, meeting space,…)

■Conference facilities

Lecture hall (large) : 500seats

Lecture hall (small) : 200seats

Meeting room (Large) : 100seats×2room→100seats×3room

Meeting room (small) : 50seats×4room→50seats×6room

■Experimental facilities

Assembly hall : 25,000㎡ (3buildings)

Common Experimental facilities : 5,000㎡ (workshop, low-temperature experiment, Radiation experiment,…)

Control center : 3,000㎡(including computer room 1,000㎡)

ILC main campus facilities(Draft)

based on the KEK report Study of the ILC Project Infrastructure Design Guidelines (February 2014)

Until the end of construction phase, those facilities will be constructed.
(also in the operation phase, the construction will be continuing.)

■Service facilities

Information & exhibition: 250㎡ (reception(half size of CERN))
→1,150㎡(+Visitor center & exhibition space, library)
Welfare facilities : 1,900㎡(cafeteria, nursery)→2,500㎡(+dispensary, recreation space)
Life support : 1,500㎡(User's office, Bank, Post office, travel agency, convenience store,…)

■Accommodation

Apartment type : 40㎡×300room→450rooms
Townhouse type : 100㎡×50room→75rooms
→need to think more considering the off campus housing

ILC main campus facilities(Draft)

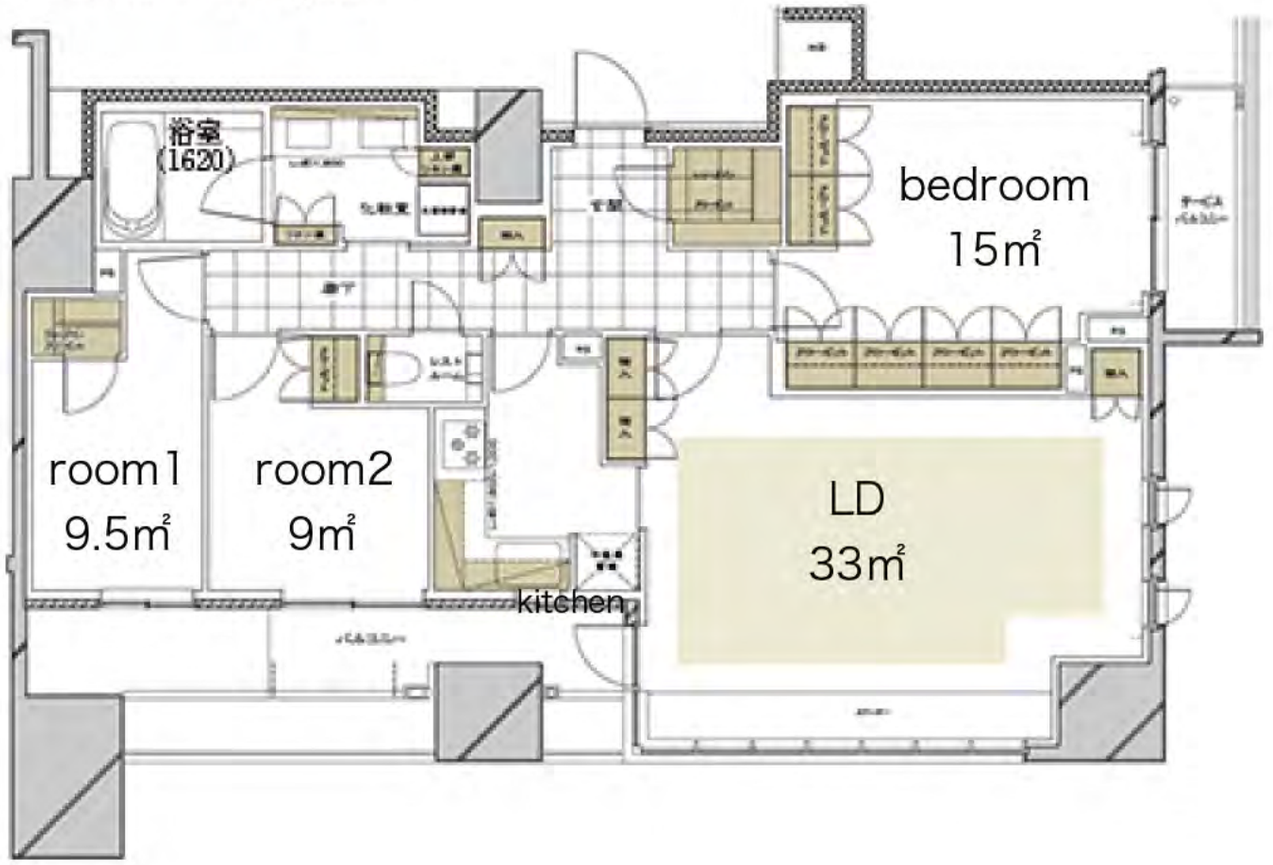
■Accommodation

Apartment type : 40㎡×300room→450rooms

Townhouse type : 100㎡×50room→75rooms

40㎡ sample

100㎡ sample



Basic hotel size: single room 15㎡(10~20㎡)　twin room 20㎡(15~25㎡)

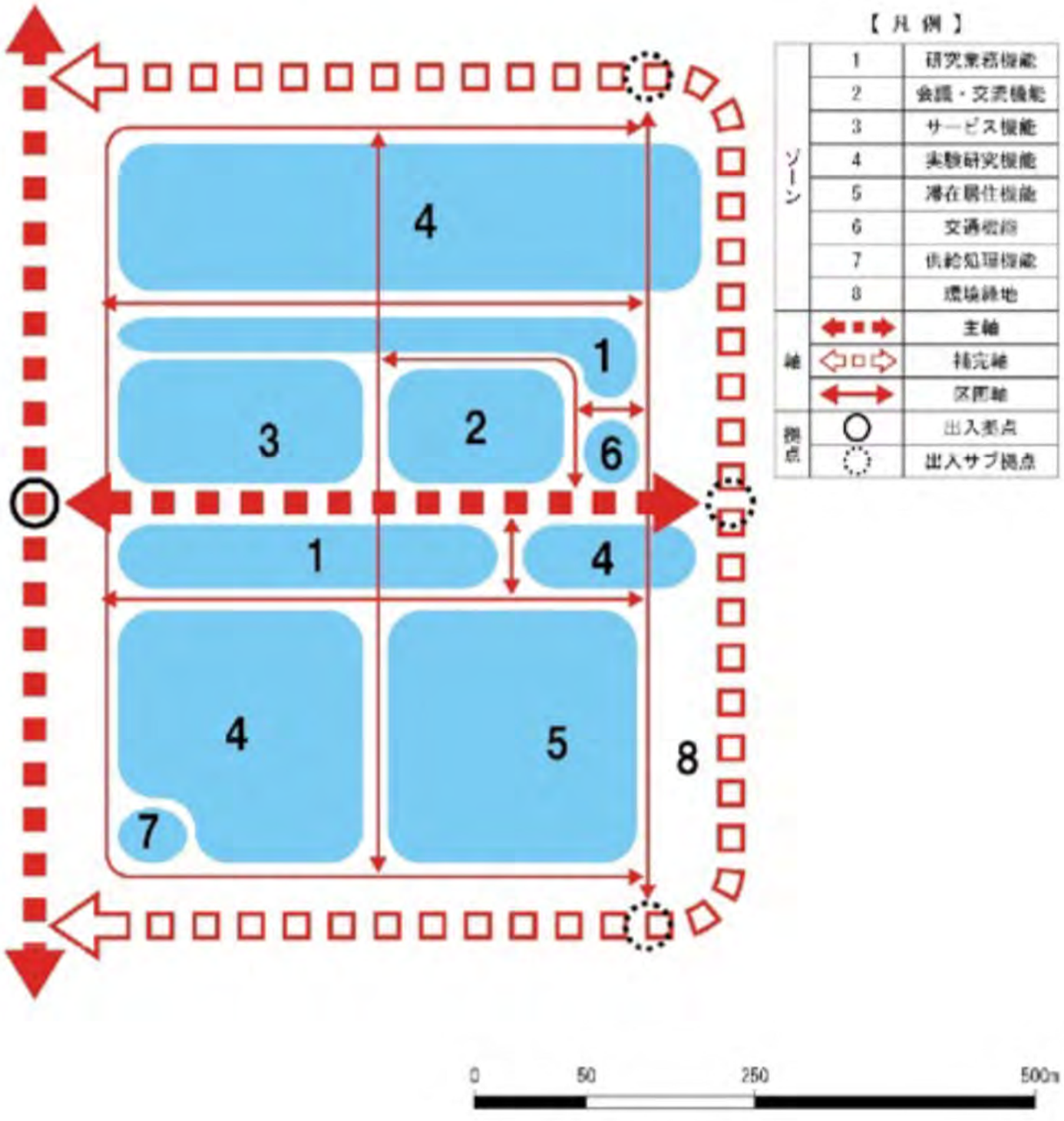
CERN, DESY : mainly for short term and single stay

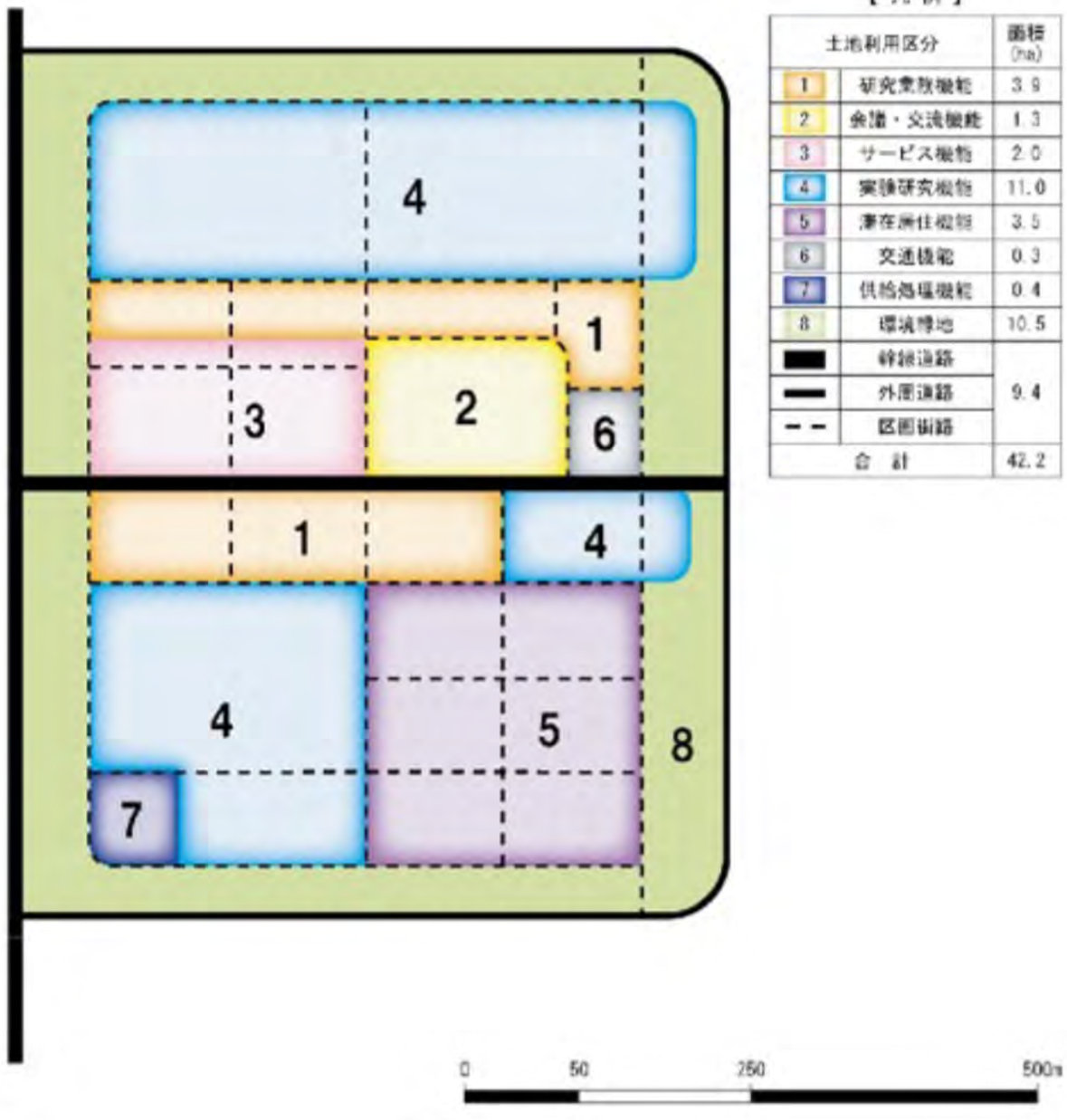
KEK : for short and long term stay　OIST : mainly for long term stay

	CERN	DESY	KEK	OIST
Photo				
rooms	Myrin site : 3 hotel single 338room 27-58CHF/night・person twin 56room 38.5-64CHF/night・person shared room 52room 14CHF/night・person **total 446room**	3guesthouse **170room 197bed**	single(without bath)　13-14 ㎡ 133room ¥1,500/night・person single(with bath)　15 ㎡ 32room ¥2,000/night・person for couple(1LDK) 45 ㎡ 24room ¥40,700~49,600/month for family(2LDK) 88 ㎡ 6room ¥62,800/month **total 195 room**	Seaside house : twin 22room Hillside/Seaside faculty house 2LDK 30house Campus village apartment 1LDK(45 ㎡) 39room, 2LDK(70 ㎡) 33room West court 2LDK(70 ㎡) 12room, 3LDK(85 ㎡) 8room, 4LDK(105 ㎡) 16room Southhill : 1LDK 24room Eastcourt : 47room **total 231room**
note	・desk, bed, toilet, shower in each room ・shared kitchen(cockware, tableware, refrigerator), TV rounge, laundry, nursing room ・rental service (hair dryer, adapter), amenity kit sales (toothbrush, soap, etc) ・FreeWi-fi, Free shuttle service to airport, parking ・keep 151rooms at Saint Genis hostel at outside of campus 	・the average occupancy rate is more than 50%. In the conference season, the occupancy rate becomes the higher. ・cleaning : outsourcing ・management/reservation : DESY ・locate near main gate		Option(extra charge) ・room cleaning ・linen change ・construction by PPP

ILC main campus layout model (KEK report)

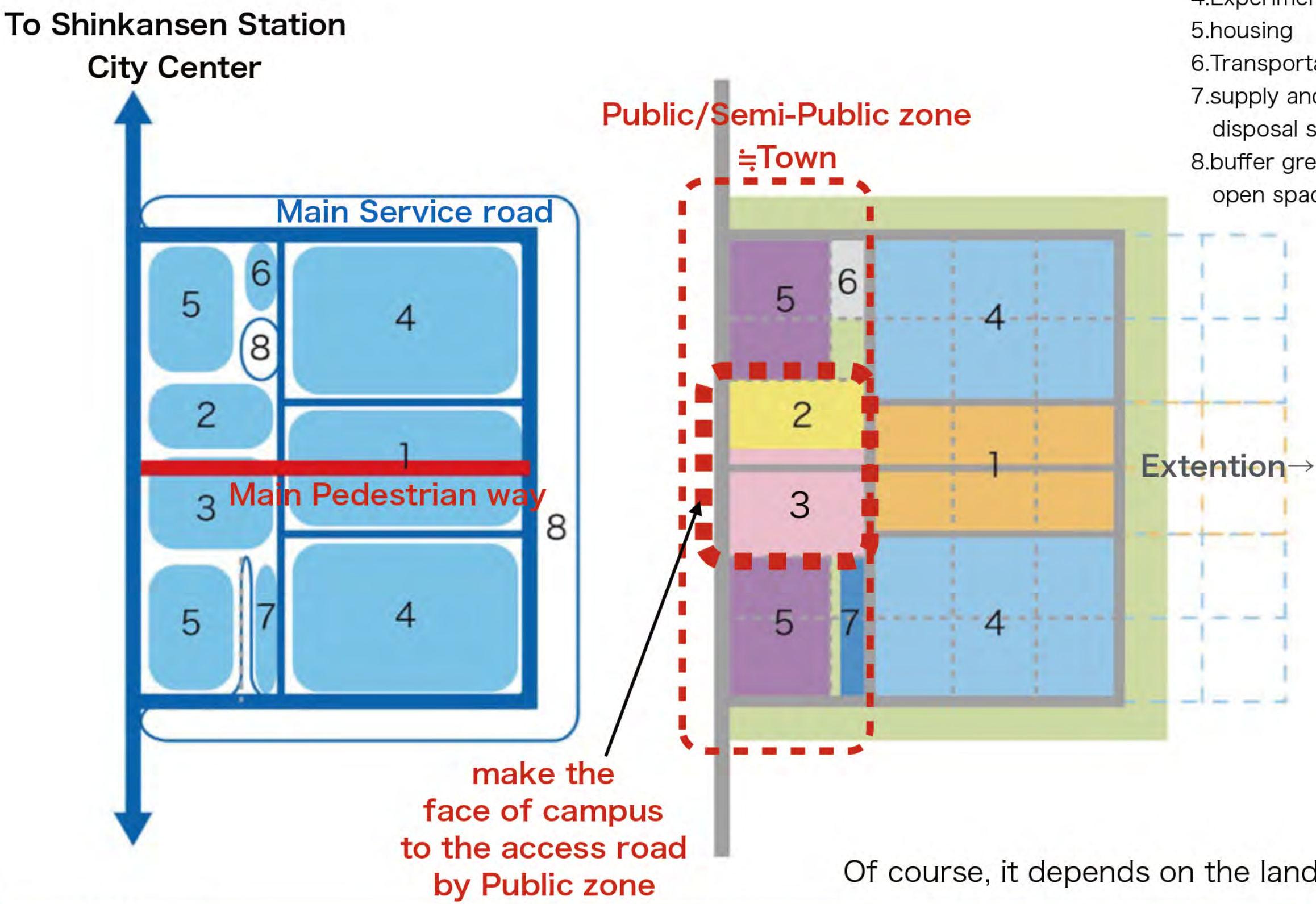
Low-rise case





ILC main campus layout model(Draft)

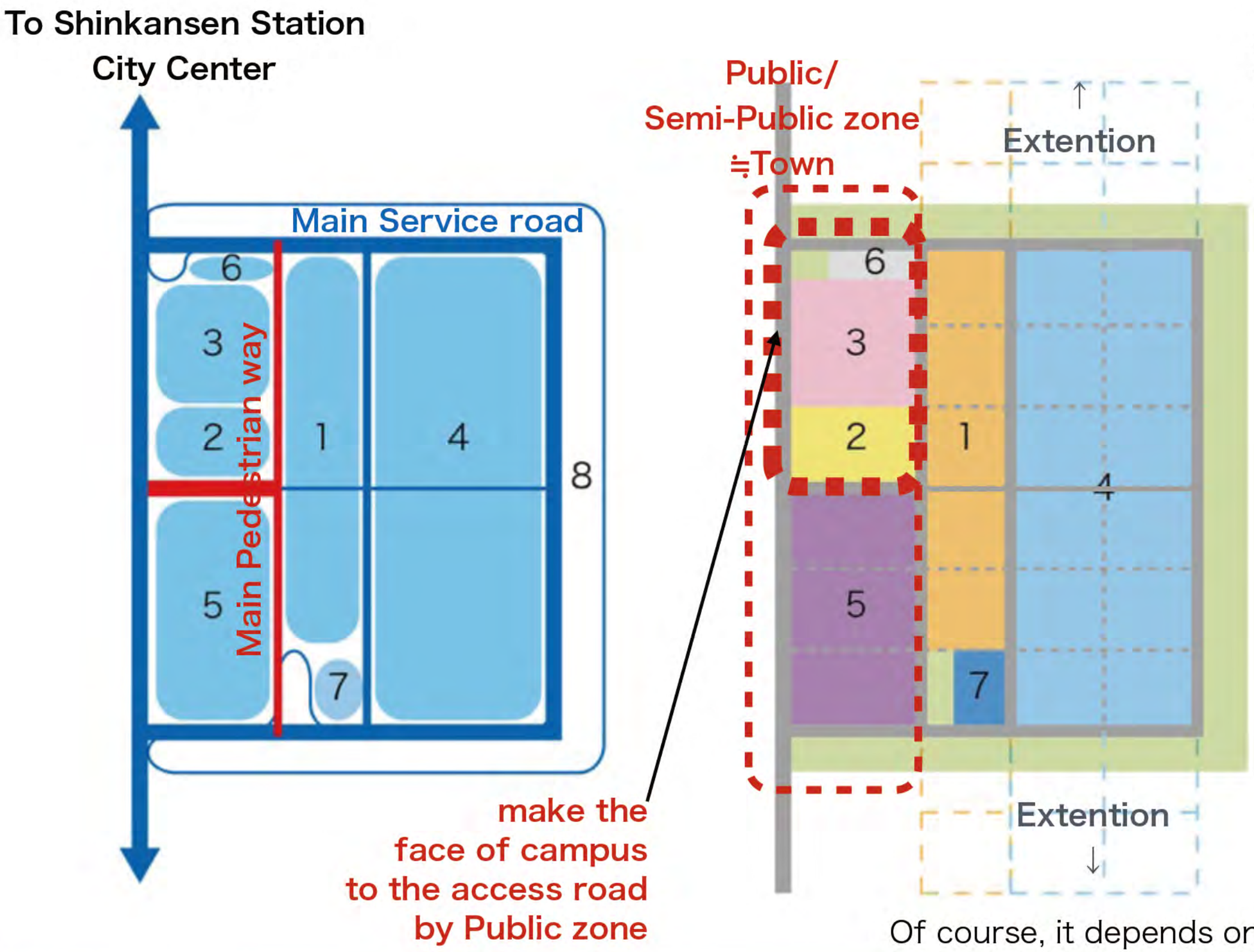
1.Office
2.Conference
3.Service
4.Experimental
5.housing
6.Transportation
7.supply and disposal services
8.buffer green/ open space



Of course, it depends on the landshape

ILC main campus layout model(Draft)-Variation

1.Office
2.Conference
3.Service
4.Experimental
5.housing
6.Transportation
7.supply and disposal services
8.buffer green/ open space



Of course, it depends on the landshape

1.Main Campus

- fundamental plan
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- facilities

2.IP campus

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IP campus schedule(draft)

	Pre Preparatory Phase		Preparatory Phase				Construction Phase										
	1	2	1	2	3	4	1	2	3	4	5	6	7	8	9	10	11
legal procedures	by local Pre study		Urban Planning(development permission), Agricultural Land Act, Forest Act…														
environmental assessment	by local Pre survey		4years Research & Conservation Plan				there is some possibility to cut environmental assessment Post-project survey (depends on the development)										
site acquisition arangement	by local Land survey & arrangement																
site development	by local Pre study		Basic & Detail design				Development(depends on the site condition)										
building construction	Pre study		Basic design				Detail design start from the usable place				Construction						
							A.H(23month)★experimental group work will start										
surrounding infrastructure (outside of campus) by local	Pre study		Basic & Detail design				Development(depends on the site condition)										

※all include the contract procedure ※A.H. schedule is from change request NO.ILC-CR-000R

IP campus requirements-ILD

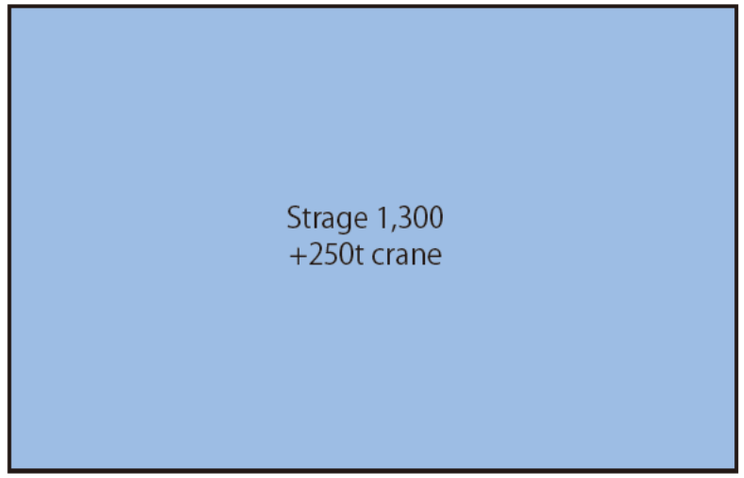
IP campus requirements from the slide presented at the ILD topical integration meeting held at LAL in the last October.

sub detector		room	area(㎡)			
Yoke		Strage	1300	250t crane		
		subtotal	**1300**			
AHCAL		load area	32	2 x 20t crane	covering10m x 20m	air conditioner
		test area	48			cooling water (16deg., sbar, 50L/min)
		strage area	120			4x (3phase 400V 32A)
						workshop 5x10m direct connection with test area 50
either AHCAL or DHCAL						office 20m2 x4 80
		subtotal	**200**			130
DHCAL		assembly, GRPC	1200			
		storage	200	250t crane		
		subtotal	**1400**			
ECAL	barrel	strage	160	15t crane		
		test	40			
		assembly	200			
		strage/test	120			
		subtotal	**520**			
	endca	strage	80			
		test	50			
		assembly	180			
		subtotal	**310**			
TPC			100			clean room
		subtotal	**100**			
VTX/FTD			?			
total			3830	+VTX/FTD+130=3960+VTX/FTD		

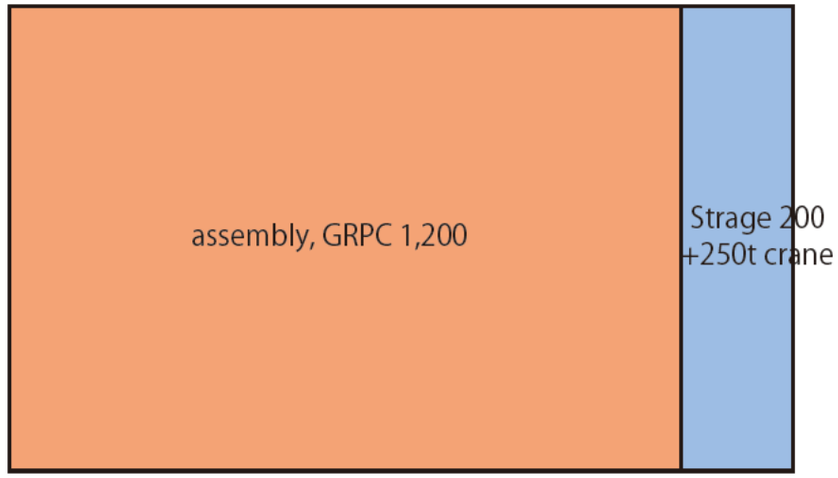
※+ restspace, WC, etc

IP campus requirements-ILD

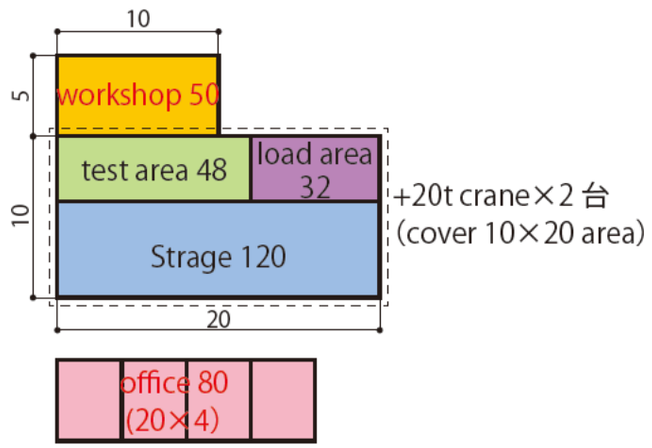
Yoke
total 1,300 ㎡



DHCAL
total 1400 ㎡



AHCAL
total 200 ㎡
(full total 330 ㎡)



Where ?

+air conditioner
cooling water (16deg.,sbar,50L/min)
4× (3phase 400V 32A)

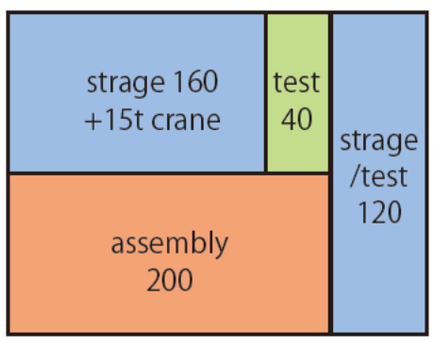
workshop 5×10m
connected directly with test area

office 20 ㎡ ×4

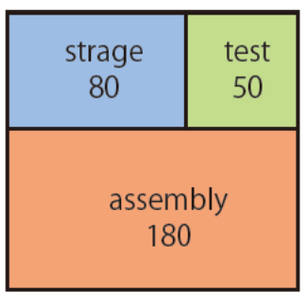
Where ?

TPC
total 100 ㎡

ECAL：barrel
total 520 ㎡



ECAL：endcap
total 310 ㎡



VTX/FTD
total ? ㎡

?

※+ restspace, WC, etc

+ necessary information

- facility requirements - SiD, addition of ILD,
  facilities for collider (cooling tower,…)

- critical size (wide×depth×height)
- layout (gather & share the same function, each connection)
- other necessary equipments

- site volume (considering future expansion)→at least, 70,000㎡?

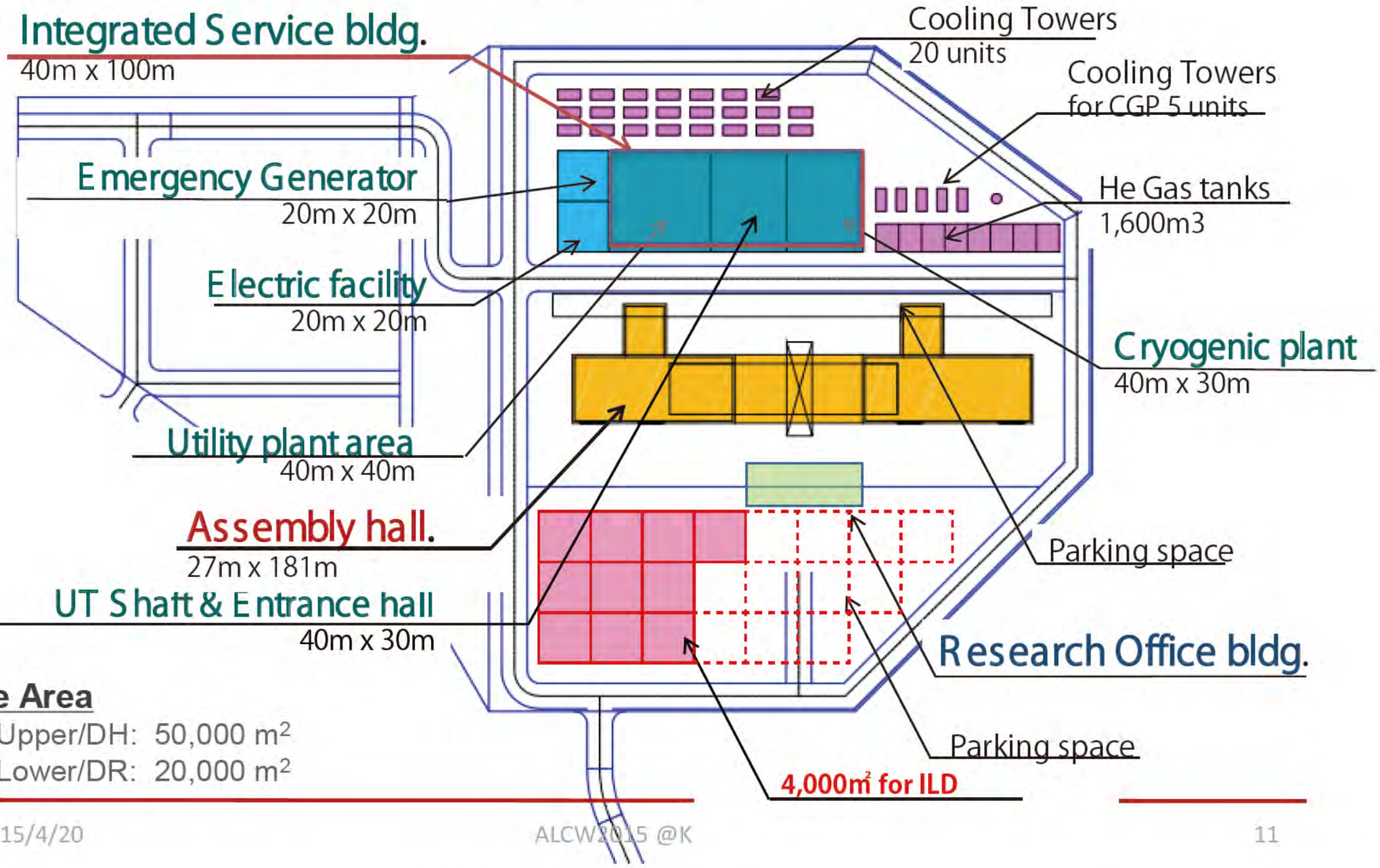
- schedule (when do you need these facilities?)

IP campus 4,000m² for ILD on the draft plan of Apr. 20 2015

LINEAR COLLIDER COLLABORATION
Designing the world's next great particle accelerator

Outline of the ground facilities

Facility Arrangement on the above ground in Operation Phase



Site Area

- ☒ Upper/DH: 50,000 m²
- ☒ Lower/DR: 20,000 m²

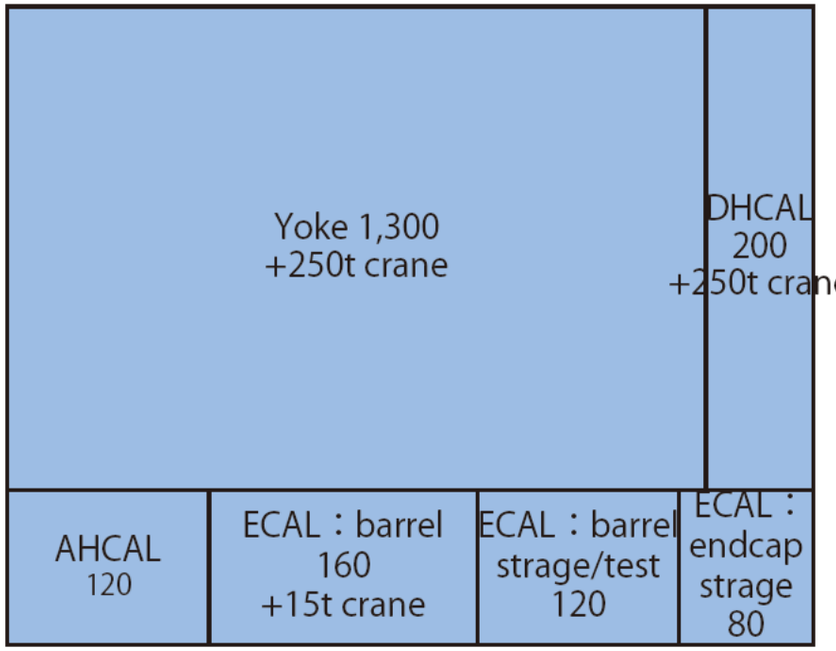
IP campus requirements-ILD sort by function

	strage	test area	load area	assembly	clean room	workshop	office	total
Yoke	1,300							1,300
AHCAL	120	48	32			50	80	330
DHCAL	200			1,200				1,400
ECAL: barrel	160	40		200				520
	120 (strage/test)							
ECAL: endcap	80	50		180				310
TPC					100			100
VTX/FTD								?
total	**1,980**	**138**	**32**	**1,580**	**100**	**50**	**80**	**3,960+?**

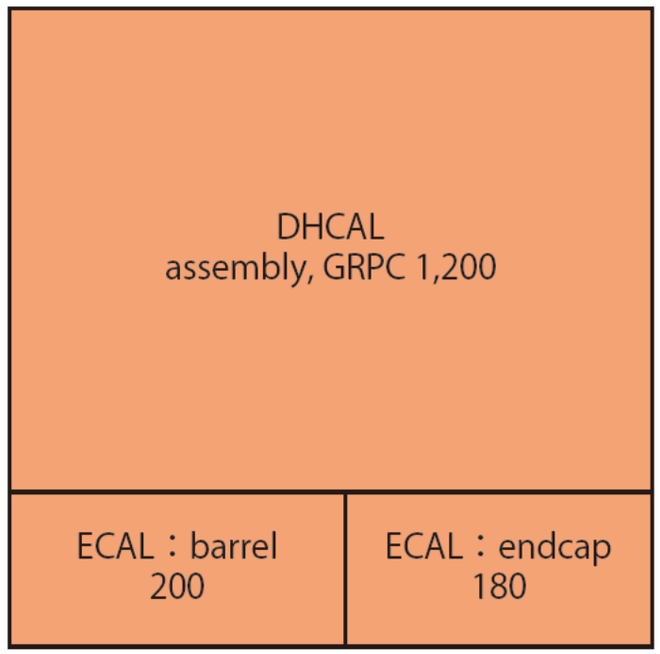
IP campus requirements-ILD sort by function

possible to gather & share?

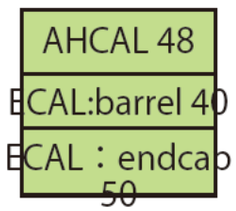
storage
total 1,980 ㎡



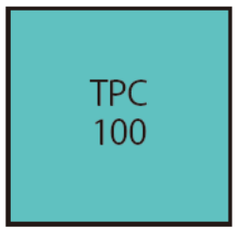
assembly
total 1,580 ㎡



test
total 138 ㎡



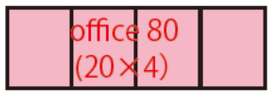
clean room
total 100 ㎡



load area
total 32 ㎡

workshop
total 50 ㎡

office
total 80 ㎡



※+ restspace, WC, etc

summary

1.main campus

・decision of site location
・check the necessary function, volume…
・adjustment of development schedule
and coping with the early phase (collaborate with local area)
(in the draft schedule, the first building will run from the 5th year of construction phase)

2.IP campus

・adjustment of development schedule
and coping with the early phase (collaborate with local area)
(in the draft schedule, A.H. will run from the 5th year of construction phase)
・check the necessary function, volume…
・based on the facilities volume, decide the site volume and location

summary

No campus “candidate” site, without your requirements.
Please give us your request.
Kitakami will answer with full efforts.