

The BIM-GIS model for EeBs integrated in healthcare districts: an Italian case study

Luca MARZI - Roberto DI GIULIO



Impossible d'accéder à l'image. Votre ordinateur manque peut-être de mémoire pour ouvrir l'image. Votre ordinateur peut-être endommagé. Redémarrez l'ordinateur, puis ouvrez à nouveau le fichier. Si le problème persiste, contactez votre fournisseur de services informatiques.

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case study



France : AP-HP Paris
University Hospital of "Ile de France"



UK : NHS Rotherham



The Netherlands : Rijnstate Ziekenhuis Arnhem

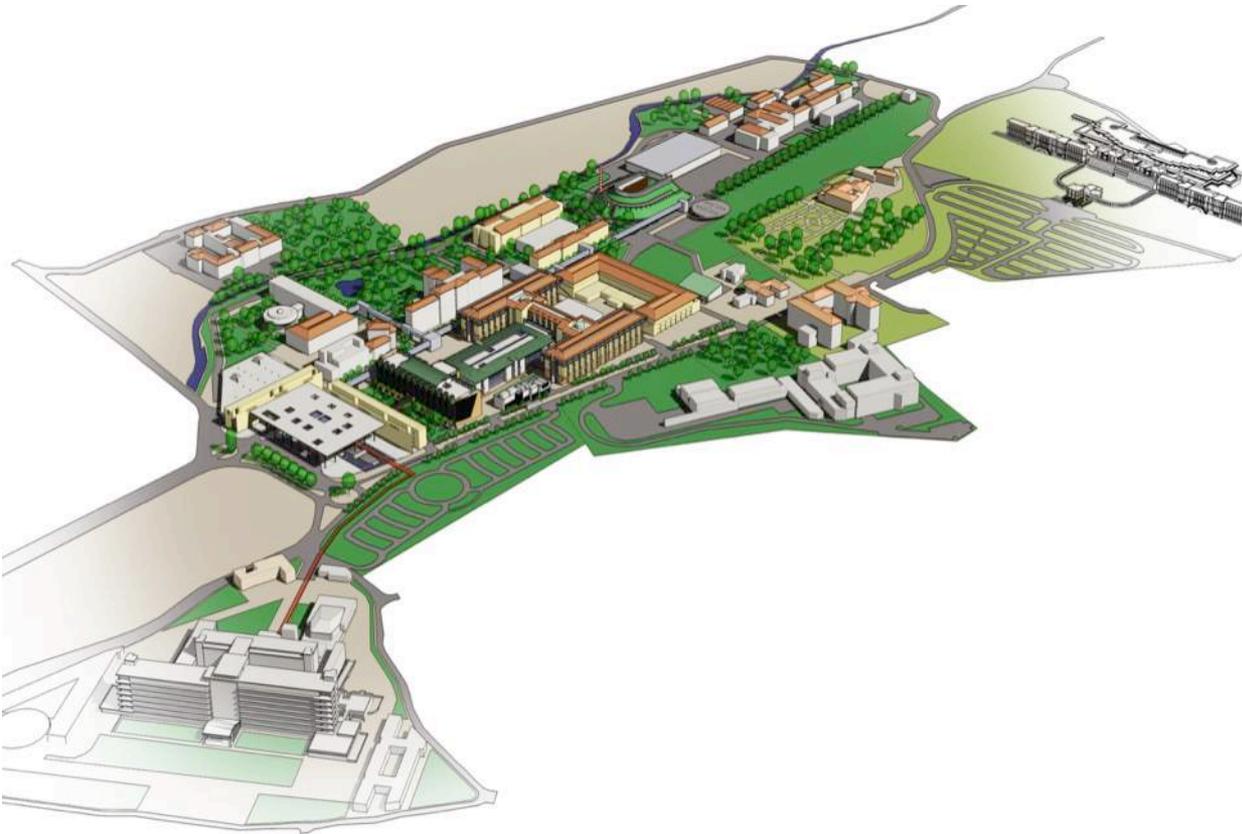


.....Optimised design methodologies for energy efficient buildings integrated in the neighborhood energy systems



Italy : AOU-Careggi Firenze

Special Town-Planning for Careggi



74 Hectares

27 Health buildings

20 Technical and Administrative buildings

10 Other buildings

14.841 rooms for 306.710 mq

1561 Beds

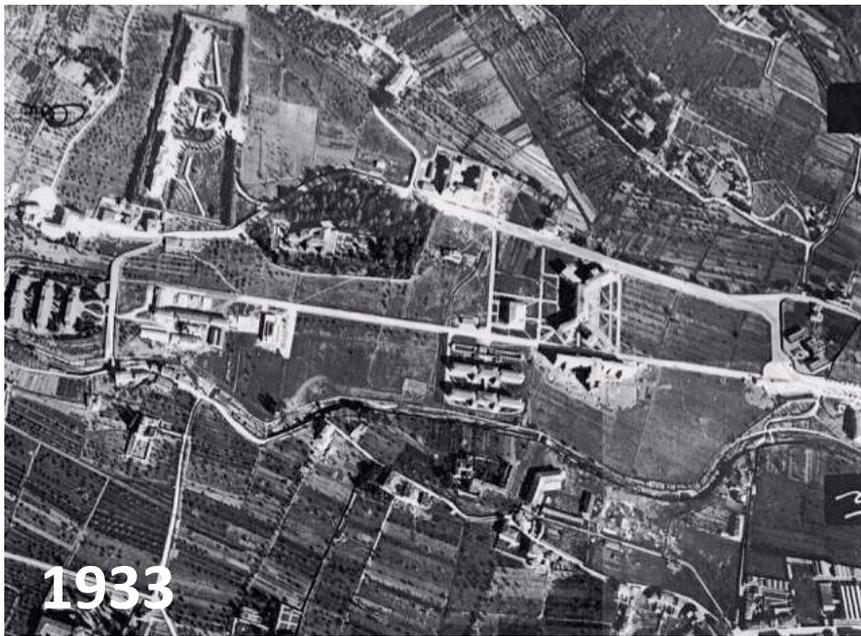
55.765 annual admissions

71.797 annual day hospital- day surgery

130.327 emergency interventions -
annual

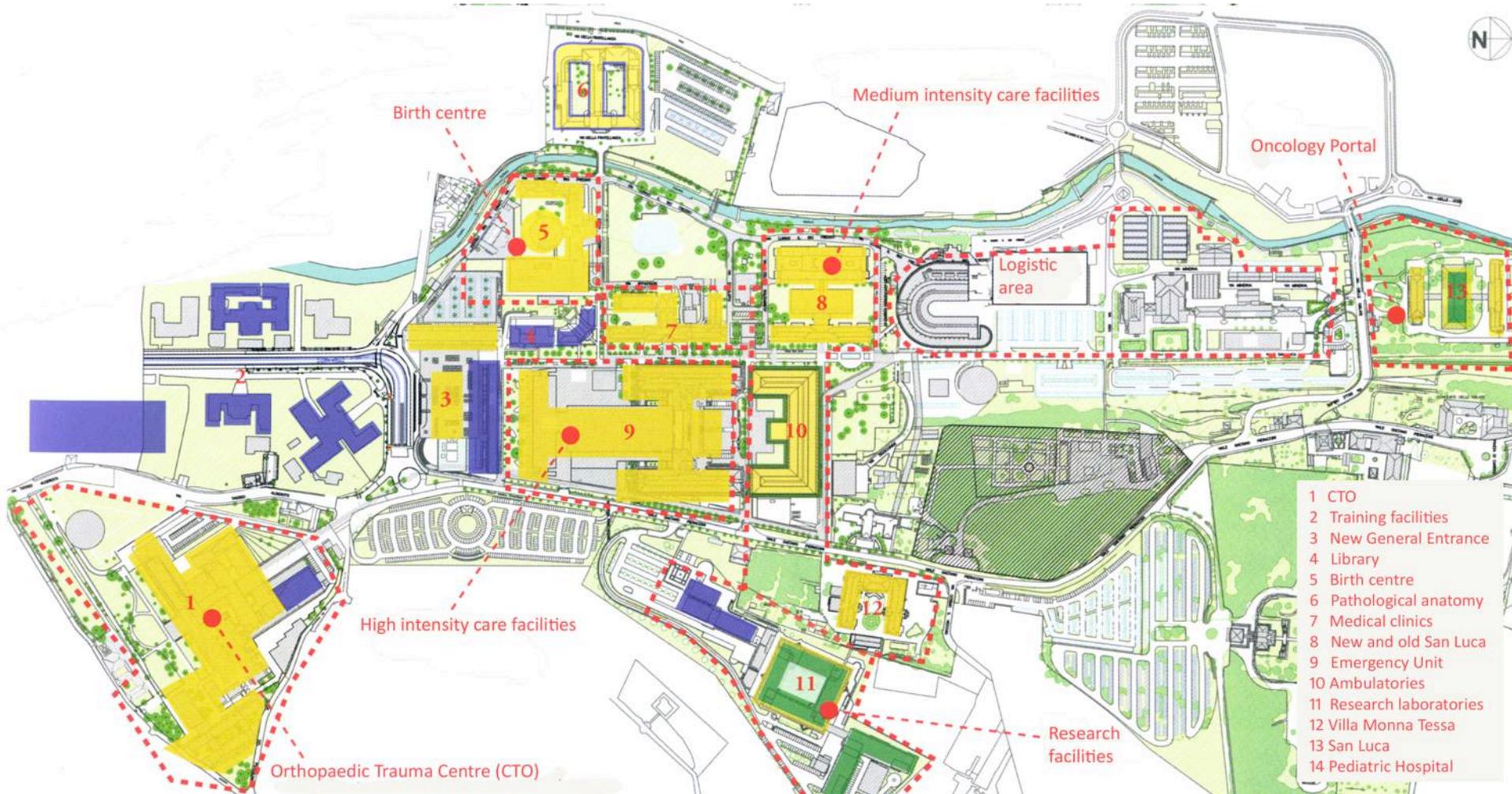
10.611.854 Prestazioni ambulatoriali

Fonte DPO, sistema SACS, URP – gennaio 2015

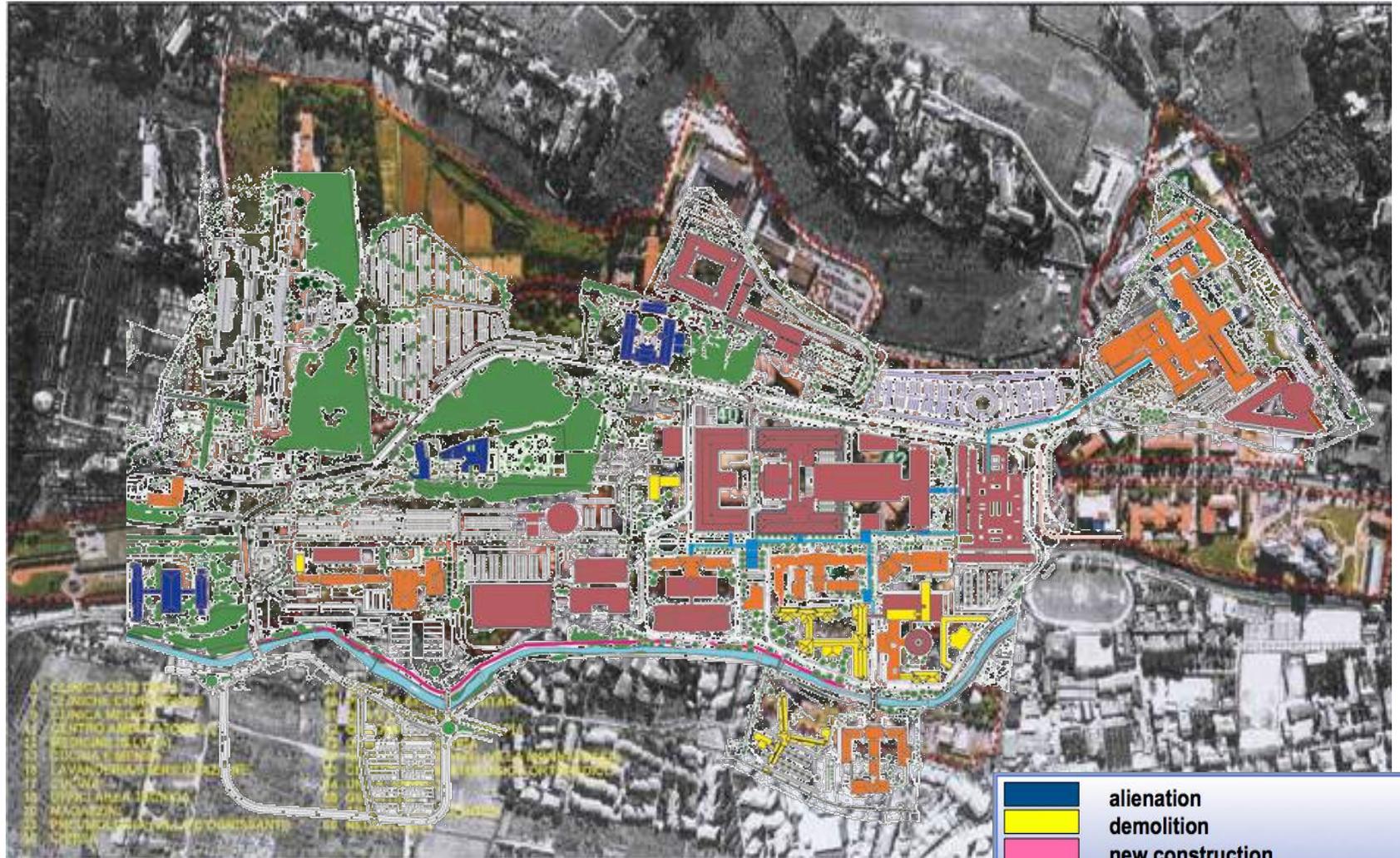


The main purposes of the “New Careggi plan” are:

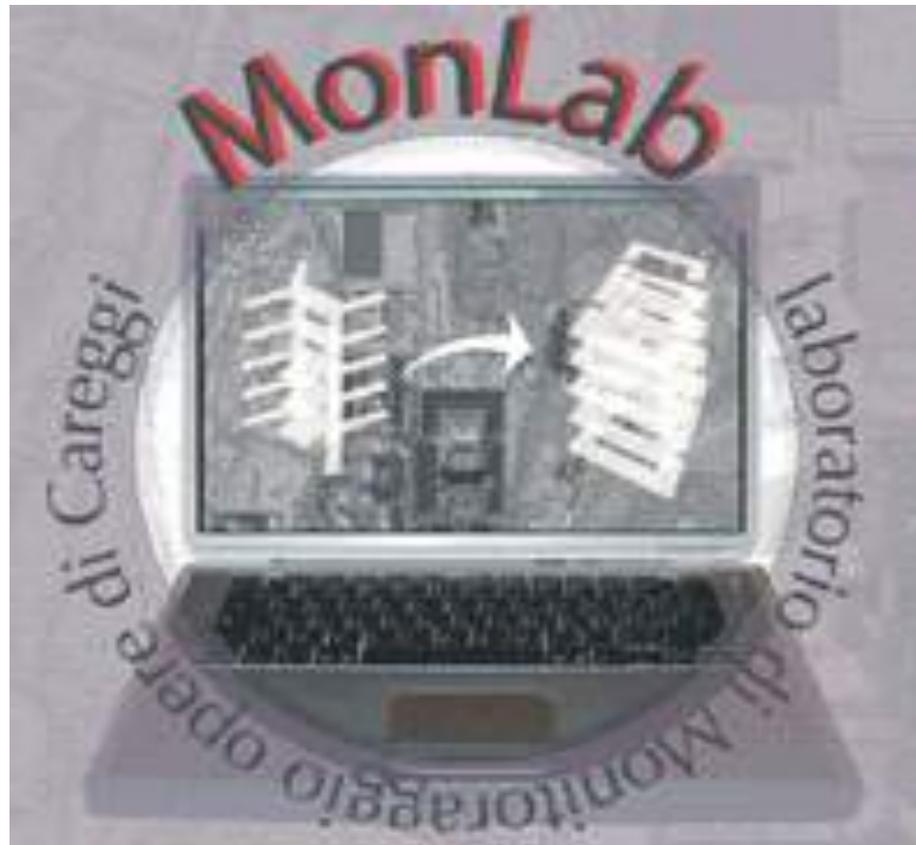
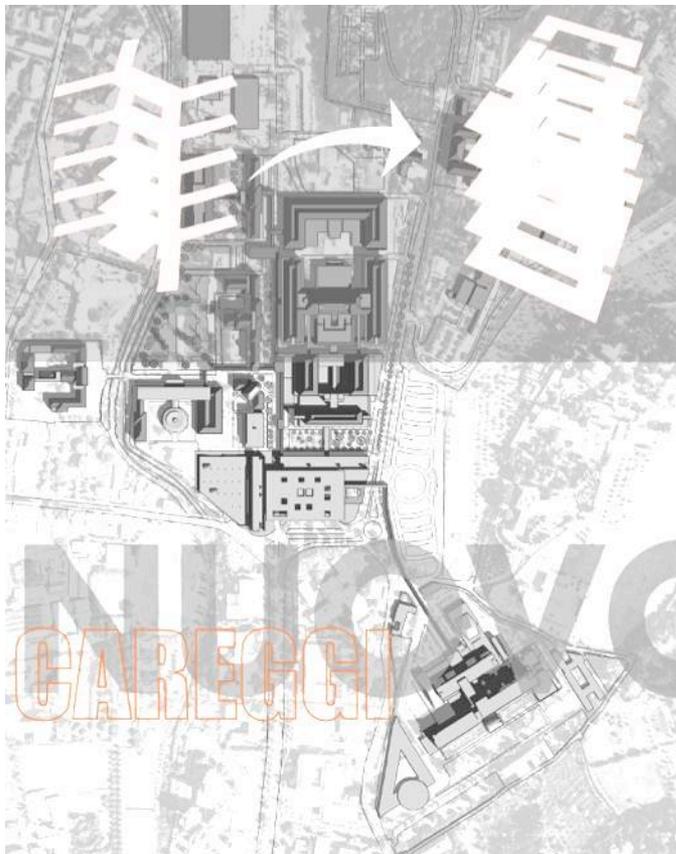
- > Renovation of the buildings
- > Reorganization of the transportation network inside and outside the hospital area,
- > Concentration of functions (care, teaching and management) to reduce the number of buildings and to merge university teaching and research activities with healthcare activities.



demolition around the 60% of the existing volumes



	alienation
	demolition
	new construction
	refurbishment
	connectivity and logistic network



IL MONITORAGGIO DEGLI INTERVENTI COMPLESSI

Governare riqualificazione struttura sanitaria

=

Governare processo complesso

8b - CLINICA CHIRURGICA
PIANO P0 - TERRA
Area Piano: 883,55 mq

Pad. 8b - Clinica Chirurgica - Piano 1

Elementi:

- 8b_001: Ingresso
- 8b_002: Pronto Soccorso/Emergenza
- 8b_003: Ufficio
- 8b_004: Ambulatorio
- 8b_005: Accoglienza/Accoglienza
- 8b_006: Ambulatorio
- 8b_007: Servizio Igiene
- 8b_008: Ambulatorio
- 8b_009: Ingresso
- 8b_010: Corridoio
- 8b_011: Accoglienza/Accoglienza
- 8b_012: Corridoio
- 8b_013: Corridoio
- 8b_014: Corridoio
- 8b_015: Corridoio
- 8b_016: Corridoio
- 8b_017: Corridoio
- 8b_018: Corridoio
- 8b_019: Ufficio
- 8b_020: Ufficio
- 8b_021: Clinica
- 8b_022: Clinica
- 8b_023a: Corridoio
- 8b_023b: Depressi
- 8b_024: Depressi
- 8b_025: Depressi
- 8b_026: Depressi
- 8b_027: Depressi
- 8b_028: Locali Personale Sanitario
- 8b_029: Corridoio
- 8b_030: Corridoio
- 8b_031: Corridoio
- 8b_032: Corridoio
- 8b_033: Servizio Igiene
- 8b_034: Servizio Igiene

Area di Attività:
Destinazione d'Uso:
 Corridoio (Ingresso / Corridoio Orizzontale)

Area: 12,44 mq

Accessi:
 - Mangione Antico

Somma totale superficie ambienti: 64.503,02 mq

Somma totale posti LETTO: 381 Voci Dettaglio

Somma totale letti Esicici: 14 Voci Dettaglio

Sono stati trovati:

- 1 Bagno diversi
- 14 Piani diversi
- 27 Area di Attività diverse
- 85 Locali diversi
- 29 Destinazione d'uso diverse
- 1913 Codici Ambienti diversi
- 13.542 diversi
- 22.500 diverse

Le parole cercate è stato trovate:

- 1312 Voci nel campo Esicici
- 1312 Voci nel campo Piano
- 84 Voci nel campo Area di Attività
- 0 Voci nel campo Classe
- 0 Voci nel campo Destinazione d'uso
- 0 Voci nel campo Codice ambiente
- 0 Voci nel campo Esicici
- 0 Voci nel campo SDO
- 5990 Voci nel campo Personale

Interno (Esicici/Locali/Posti)	Struttura	Piano	Codice ambiente	Destinazione d'uso	Classe	Dettaglio Occupanti	SAI	Area attività	SDO	Posti Letti	Letti Tecnici	HQ	Risa
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_101	Locali Tecnici	Locali GEURP	-	-	-	-	-	-	64,20	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_102	Locali Tecnici	Locali GEURP	-	-	-	-	-	-	89,48	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_103	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	19,94	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_104	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	39,32	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_105	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	20,26	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_106	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	300,84	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_107	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	3.030,95	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_108	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	10,60	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_109	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	3.011,49	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_110	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	13,36	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_111	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	3.013,49	Area Non Sanitaria
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_112	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	35,42	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_113	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	325,24	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_114	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	30,10	Ufficio
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_115	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	621,42	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_116	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	280,72	-
0/0/0	PARCHEGGIO CTO	INTERNAIO	25_208_117	Locali Tecnici	Locali Tecnici	-	-	-	-	-	-	443,74	-

Powered by SACS

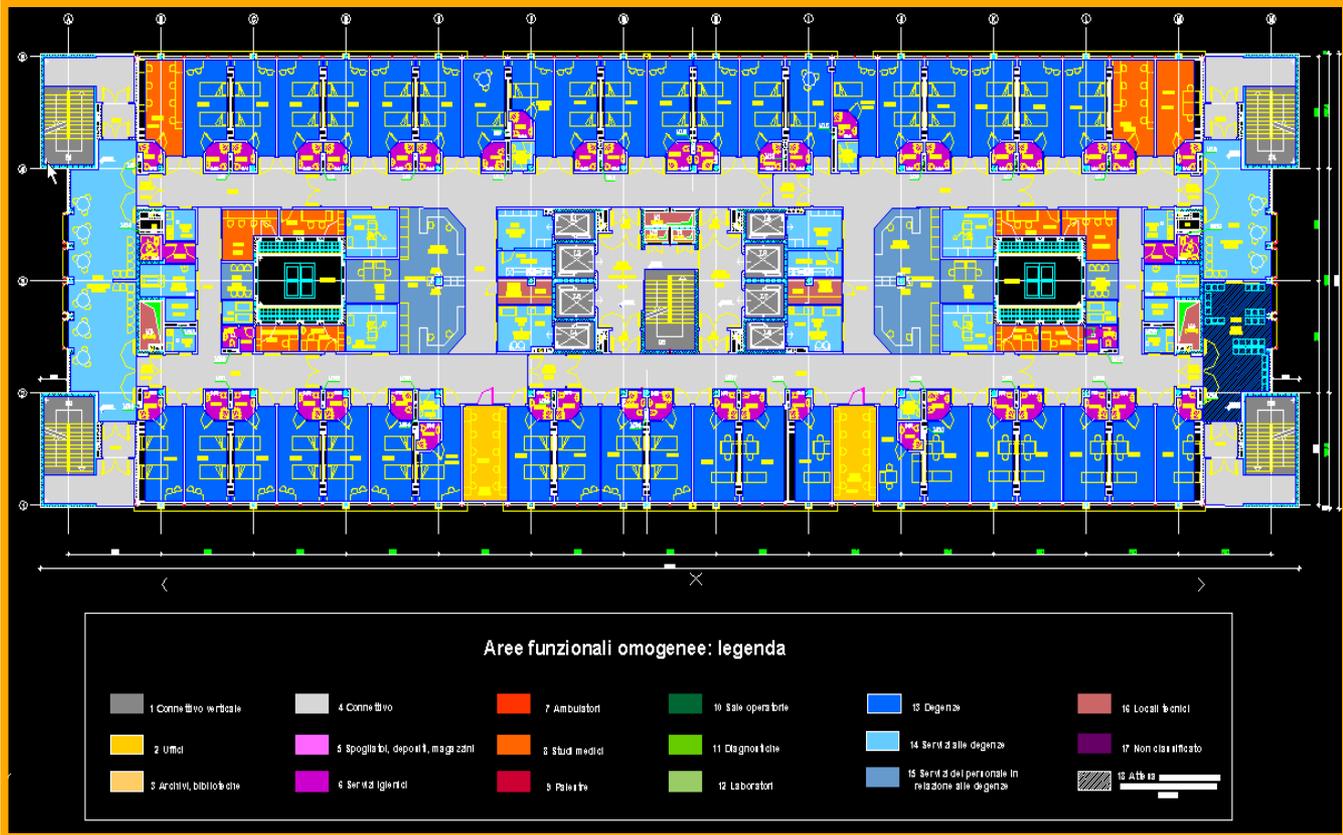
Eureka!

CAREGIS

Powered by SACS



The **SACS©** system is a custom Visual Basic software that **drives Autocad** to manage and **analyses digital plans of buildings coded on specific layers**. Moreover, the system is linked to the georeferenced Hospital Information System (HIS) designed in Microsoft Visual Basic. The particularity is the **“everything inside DWG”** approach: **all data are stored inside the digital maps** allowing anytime to rebuild the whole information having nothing but the DWG files.



S.A.C.S.© (acronym of the Italian “Systems for the Analysis of Structural Assets”), is a **suite** used by the company as a **structural asset management system**.

Detailed description of the SACS system (GIS development included)

Computer Aided Facility Management



Accessibility

Cleaning

Signs

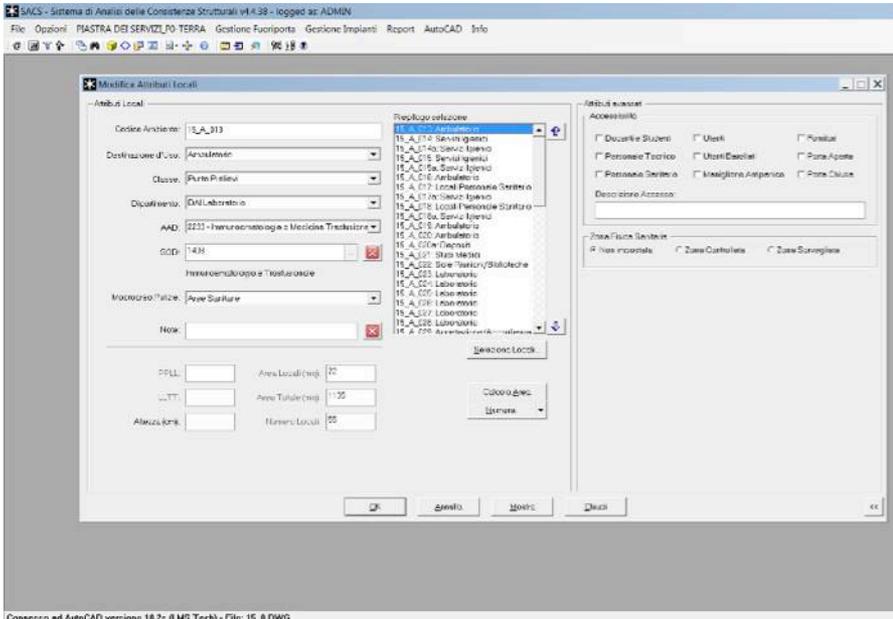
Wiring

Voice and data

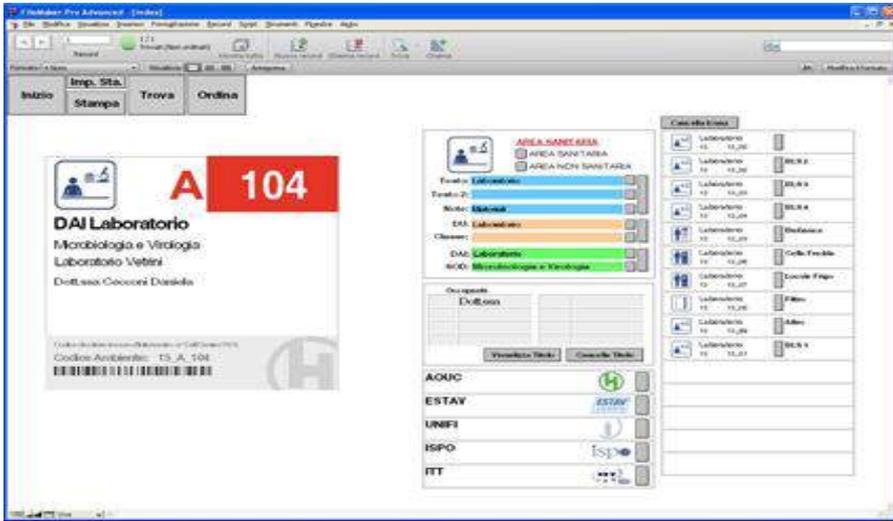
Electromedical equipment

LICENSE (accreditation)

Rooms management



Connesso ad AutoCAD versione 16.2 (64-bit Tech) - File: 15_8.DWG

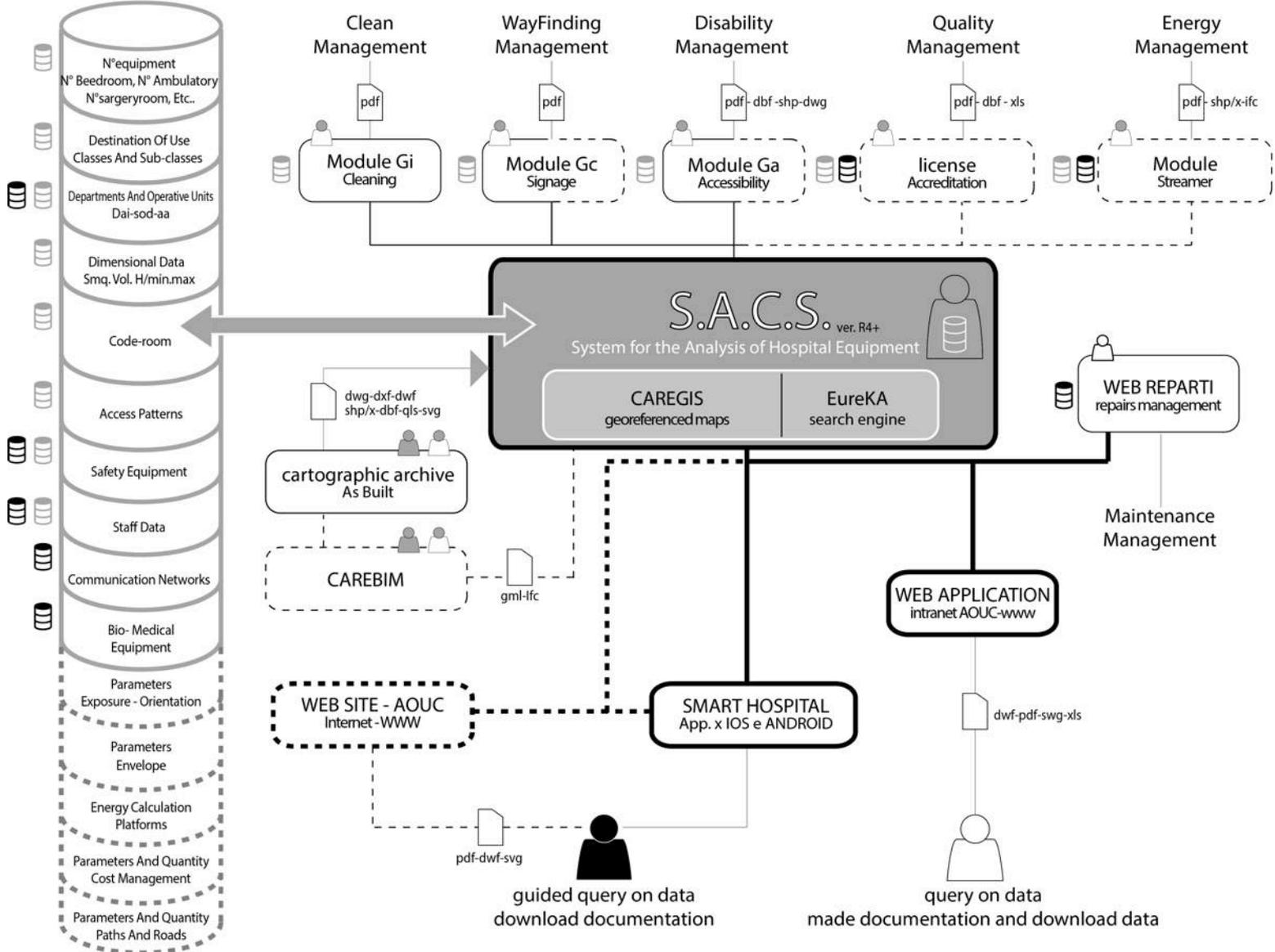


This software works at a single room scale, which corresponds to a record.



The peculiarity of S.A.C.S system is its capacity to manage digital cartography not specifically designed for the software, but that could be retrieved and adapted by all the players that had a role in the implementation of the projects.





<p>Users</p> <ul style="list-style-type: none"> MON.Lab staff technical staff all AOUC staff all users 	<p>Types of DB</p> <ul style="list-style-type: none"> OTHER - DB DB - SACS 	<p>Construction phase</p> <ul style="list-style-type: none"> Done In Progress 	<p>Format</p> <ul style="list-style-type: none"> File icon
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DESCRIPIANO_NOMEGRUPPO_AFOBLOCCO_NUNITA_PPLL_DAI_SOD_ARATT

- DESCR_PIANO: piano dell' edificio del gruppo
- NOMEGRUPPO: "P" + livello + "-" + zona cartiglio + [CONN]
- AFOBLOCCO: ID della D.U.P. del gruppo
- NUNITA: numero di ambienti funzionali specifici
- PPLL: numero di posti letto
- DAI: codice del D.A.I. di competenza
- SOD: abbreviazione del nome della S.O.D. (S.O.D. singole) o codici delle S.O.D. (S.O.D. multiple) afferenti
- ARATT: codice dell' Area di Attività del gruppo

SLR: the square-light ratio → 15 bit
6 bit → Codice Locale
9 bit → Grado di conformità

medical gasses → 16 bit
4 bit → Ossigeno
4 bit → Protossido
4 bit → Aria
4 bit → Vuoto

Tot: 65 bit

H: the height of the room → 10 bit (max 1023cm)

ATU.: → 9 bit (511 unità)

Class (D.U.S.) → 9 bit
000000001 a 010000001 → Class ID
010000010 a 011111111 → Non utilizzati
000000000 → Nessuna Classe per la D.U. selezionata
100000000 → Classe non selezionata

C.E.I. → 3 bit
000 a 010 → Gruppo locale
011 → locale non ad uso medico
100 → Gruppo non selezionato

Categoria → 3 bit
000 → Categoria non selezionata
01x a 11x → Categoria locale
xx1 → Locale conforme
xx0 → Locale non conforme



Automation: departments

The collage illustrates the automation process in AutoCAD 2012. It shows several instances of the software interface, each displaying a different layer list (S. Nome, O. C., B., Col., Tipo, Spess., Tras., Stile, Colore). The layers are organized into various categories such as 'A-Retini...', 'A-Scritte...', 'A-Sigle...', 'ASCE', 'Compartimentazioni', 'Detpoints', 'Intonaco', 'POLLINEE MURI', 'Presidi antincendio', 'QUOTE', 'RETI-MURI', 'SCALE', 'SDP - 01-Building-Wall...', 'SDP - 02-Building-Do...', 'TESTI SPP', and 'Vie di esodo'. The final screenshot shows a floor plan with room labels: '15_A_034 Ambulatorio Visita', '15_A_033 Ambulatorio Visita', '15_A_035 Punto Prelevi', and '2231-Accoglienza FrontOffice Dipartimento Diagnostica di Laboratorio'.

Automation: cleaning

Automation: captions

Stages of data-entry and administration of system.

Elenco Destinazioni d'Uso e Classi

Destinazioni d'Uso:

N_DU	NOME_DU	FUORIPORTA	COD_PIT	CADColor
19	Degenza Specialistica	Degenza	19_00	
33	Depositi	Depositi	33_00	
5	Diagnostica per Immagini	Diagnostica per Imm	05_00	
20	Dialisi	Dialisi	20_00	
40	Didattica	Didattica	40_00	
10	Endoscopia	Endoscopia	10_00	

Classi:

N_CLASSE	DESCR_CLASSE	FUORIPORTA	CODICE_PIT
29	Broncoscopia	Broncoscopia	10_01
30	Endoscopia Digestiva	Endoscopia Digestiva	10_02
184	Endoscopia Urologica	Endoscopia Urologica	
212	Lavaggio-Alta Disinfezione	Lavaggio-Alta Disinfezione	
213	Preparazione Paziente/Risveglio	Preparazione Paziente/Risveglio	
231	Sala Comandi/Controllo	Sala Comandi/Controllo	
272	Altro	Altro	

SOD / Aree di Attività

Codice	Nome	Coordinatore Infermieristico	CADColor
2002	Comparto Operatorio Ortopedico		
2017	Pronto Soccorso Ortopedico		
2018	Terapia Intensiva Ortopedia		
2045	Degenza Ortopedia Breve e Day Surgery		
2046	Degenza Traumatologica		
2047	Degenza Ortopedia Elettiva A		
2048	Degenza Ortopedia Oncologica e Ricostruttiva		
2049	Degenza Ortopedia Elettiva B		
2112	Ambulatorio Ortopedico B (Onde d'Urto)		
2114	Poliambulatorio e Preospedalizzazione Ortopedia		
2202	Staff e Supporto DAI Ortopedia		
2203	Accoglienze e Front Office Ortopedia		

Elenco Dipartimenti, SOD e Aree di Attività

Dipartimenti:

N_DAI	Dipartimento	Direttore	CADColor
2	DAI Ortopedia	DS	
3	DAI Neuroscienze	Messaccesi Luca	
4	DAI Laboratorio	Messer Gianni	
5	DAI Del Cuore e dei Vasi	Gensini Gian-Franco	
6	DAI Specialità Medico-Chirurgiche	DS	
7	DAI Materno-Infantile	Scorselli Gianfranco	
8	DAI Organi di Senso	Menchini USO	
9	DAI DEA a Medicina e Chirurgia Gen. e di Urgenza	Nazzari Carlo	
10	DAI Radiologia	Toddi Gian Luigi	
11	DAI Diagnostica per Immagini	Menci Ilvo	

SOD / Aree di Attività:

Codice	Nome	Direttore	CADColor
1112	Ortopedia Oncologica e Ricostruttiva	Caporino Rodolfo	
1122	Ortopedia Generale 1	Innocenti Massimo	
1111	Ortopedia Generale 2	Angeloni Pierzo	
1119	Traumatologia e Ortopedia Generale	Euzzi Roberto	
1117	Chirurgia e Microchirurgia della Mano	Genuso Massimo	
1118	Anestesia e Rianimazione	Campino Maria Costantina	
1300	Malattia del Metabolismo Minerale e Osseo	Firaldi Maria Luisa	
1325	Traumatologia Maxillo-Facciale	Spinelli Giuseppe	
1317	Medicina Geriatrica	Mannucci Marco	



Space destination

	Operating Room (beds) 01_00	General OR; Specialist OR; Hybrid OR; Orthopedics OR; Pre-Operation (Patient) /Awakening; Pre-Operation (Staff);
	Radiotherapy 04_00	Radiotherapeutic Applications; Thomotherapy; Gamma-Knife; CT Simulator; Control Room
	A&E 07_00	Examination Box; Discharge Room; Isolation; Triage; Shock-room; Short Observance; Intensive Observance; Other
	Endoscopy 10_00	Bronchoscopy; Digestive Endoscopy; Urologic Endoscopy; Disinfection; Pre-operation (Patient); Control Room; Other
	Laboratory 13_00	BLS 1; BLS 2; BLS 3; BLS 4; Biobank; Cold Cell; Cold Store; Filter; Other
	Rehabilitation 16_00	Gym; Swimming Pool; Physical Therapy & Rehabilitation
	Specialist Ward (beds) 19_00	Psychiatric Ward with Toilet; Hematologic Ward with Toilet; Isolation Ward with Toilet; Pediatric Ward with
	Toilet 22_00	Public Toilet, Staff Toilet, Patient Toilet (for Invalids), Public Toilet (for Invalids), Staff Toilet (for Invalids), Bedpan
	Acceptance 25_00	Acceptance; Information; CUP; Administration; Porter's Lodge
	Morgue 28_00	Autopsy; Corpse Waiting; Corpse Exposure; Cold Store; Other
	Outer Area 31_00	Footpath; Parking; Other
	Lavandry 34_00	
	Technical Room 37_00	Vertical Atrium; Server; Sound & Data; Lift House; Boiler House; Electric Panel; EG / UPS; Other
	Didactics 40_00	Administration; Office; Classroom; Auditorium; Conference Room; Simulator; Other

	Intensive Care Unit (beds) 02_00	IC Box; NCC; Filter; Washing; Other
	Diagnostic 05_00	Control Room; CT; MRI; Uninterventionist Angiography; Radiography; COM; RIS-PACS;
	Day Surgery 08_00	
	Frigoemoteca 11_00	
	Mental Health Unit 14_00	Therapeutic & Rehabilitative Assistance; Socio-Rehabilitative Assistance; Minor Intensity Therapeutic & Rehabilitative
	Day Hospital 17_00	
	Dyalisis (beds) 20_00	
	Medical Office 23_00	Office; Talk Room; Other
	Waiting Room 26_00	Waiting Room for Relatives; Waiting Room for Patients; Game Space; Living Room; Other
	Meeting Room Library 29_00	Meeting Room; Reading Room; Library; Other
	Unclassified 32_00	
	Locker Room 35_00	Staff Locker Room; Patient Locker Room
	Medical-Aid Fecundation 38_00	Level 1; Level 2; Level 3A; Level 3B
	Connective 41_00	Horizontal Connective; Verical, Connective/Stairs; Litter Lift; Lift; Elevator; Service Lift; Stairlift; Backstairs;

	Sub-Intensive CareUnit (beds) 03_00	
	Nuclear Imaging 06_00	Medicine Preparation; Diagnostic; Gamma Camera; Other
	Delivery Room (beds) 09_00	Delivery Room; Labour Room; Pre-Operation (Staff); Substerilization; Filter; Other
	Ambulatory 12_00	Echocardiography; Ergometry; Dynamic Electrocardiography; Surgery Ambulatory (local anaesthetic); Surgery Ambulatory
	Pharmacy 15_00	Medicine Store; Fridge; Medicine Collecting; Antiblastic Medicine Unit; Medicine Preparation; Other
	Ward (beds) 18_00	Ward with Toilet; Ward without Toilet; Crèche; Other
	Staff Room 21_00	Nursing Coordinator; Reporting; On-Call-Doctor Room; Tisanery; Nurse Room; Relaxation Area; Other
	Sport Medicine 24_00	1st Level; 2nd Level
	Public Service 27_00	Commercial; Chapel; Showroom; Game Room; Other
	Office 30_00	Office; Administration; Direction; Other
	Warehouse 33_00	Surgery Instruments; Medicine; Cleaning; Dirty Stuff; Clean Stuff; Archive; Other
	Kitchen Work Canteen 36_00	Cooking; Work Canteen; Larder; Cold Store; Diet Kitchen; Meat Treatment; Washing; Warehouse; Other
	Sterilization Disinfection 39_00	
	Hemoteca 42_00	



SACS



Sistema di Analisi delle Consistenze Strutturali dell'Azienda Ospedaliero-Universitaria Careggi

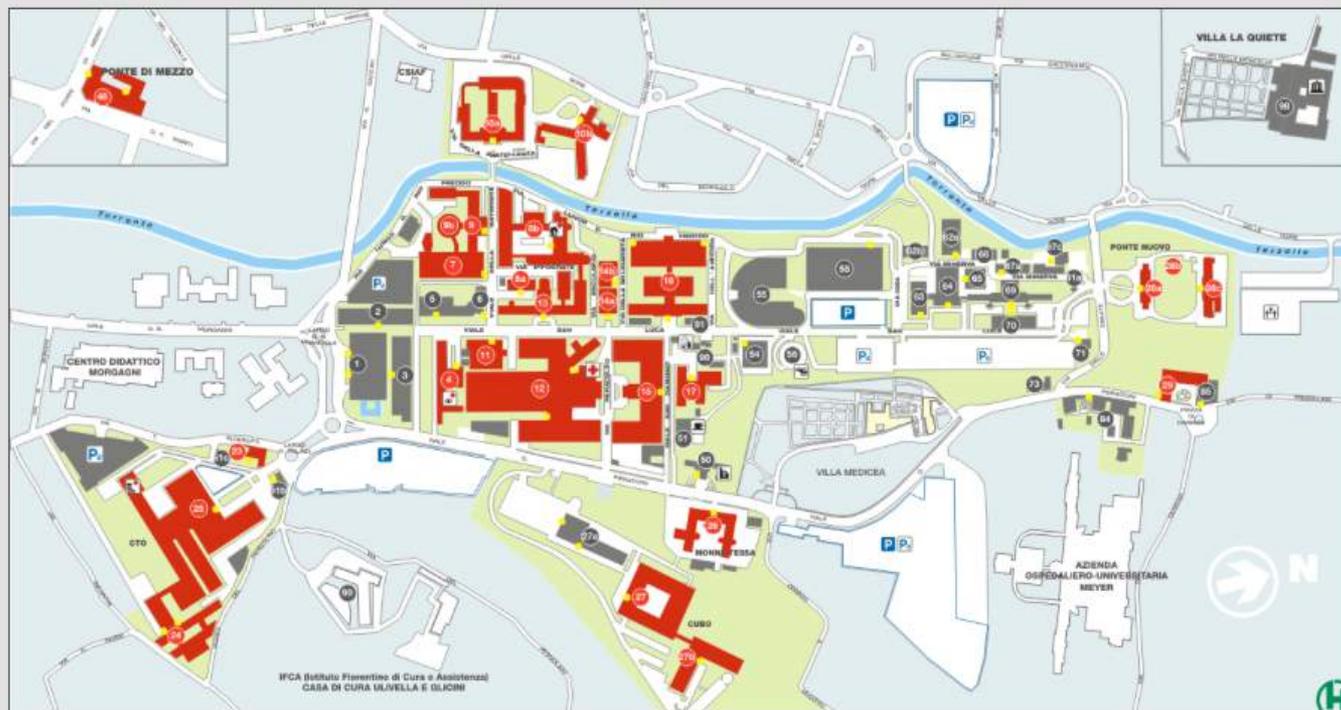


Per la corretta visualizzazione è necessario installare [Autodesk Design Review](#)

- DAI
- SOD / UQ
- AAD
- Destinazioni
- Use
- Report per Padiglioni
- Report per DAI



Maternità, Margherita, Libera Professione e Senologia con il supporto dei ragazzi del Servizio Civile - CareGIS Piante sinottiche per livelli di tutto Careggi





- Elenco locali:**
- 10c_101: Degenza Ordinaria
 - 10c_101a: Servizi Igienici
 - 10c_102: Degenza Ordinaria
 - 10c_102a: Servizi Igienici
 - 10c_103: Degenza Ordinaria
 - 10c_103a: Servizi Igienici
 - 10c_104: Degenza Ordinaria
 - 10c_104a: Servizi Igienici
 - 10c_105: Degenza Ordinaria
 - 10c_105a: Servizi Igienici
 - 10c_106: Degenza Ordinaria
 - 10c_106a: Servizi Igienici
 - 10c_107: Degenza Ordinaria
 - 10c_107a: Servizi Igienici
 - 10c_108: Degenza Ordinaria
 - 10c_108a: Servizi Igienici
 - 10c_109: Degenza Ordinaria
 - 10c_109a: Servizi Igienici
 - 10c_110: Studi Medici
 - 10c_1101: Connettivo
 - 10c_1102: Connettivo
 - 10c_110a: Servizi Igienici
 - 10c_111: Studi Medici
 - 10c_111a: Servizi Igienici
 - 10c_112: Degenza Ordinaria
 - 10c_112a: Servizi Igienici
 - 10c_113: Degenza Ordinaria
 - 10c_113a: Servizi Igienici
 - 10c_114: Degenza Ordinaria
 - 10c_114a: Servizi Igienici
 - 10c_115: Degenza Ordinaria
 - 10c_115a: Servizi Igienici
 - 10c_116: Degenza Ordinaria
 - 10c_116a: Servizi Igienici
 - 10c_117: Locali Personale Sanitario
 - 10c_117a: Servizi Igienici
 - 10c_118: Studi Medici

16c - SAN LUCA NUOVO
PIANO P1 - PRIMO
Area Piano: 2622,96 mq

- Mostra didascalie
 Mostra nomi Personale
 Mostra Destinazioni d'Uso
 Mostra retini Destinazioni d'Uso
 Mostra retini DAI
 Mostra retini Aree di Attività
 Mostra retini SOD
 Mostra retini Fisica Sanitaria
 Mostra Accessi
 Mostra retini e didascalie Pulizie

Aggiorna



16c_109a

Area di Attività:
 2068 - Degenza Gastroenterologica

Destinazione d'Uso:
 Servizi Igienici (Servizi per Pazienti (Disabili))

DAI: 06 - Specialità Medico-Chirurgiche

SOD MULTIPLE:
 = 1206 - Gastroenterologia 2
 = 1272 - Gastroenterologia 1

Area: 3,11 mq

Accessi:
 = Mangione Antipanico

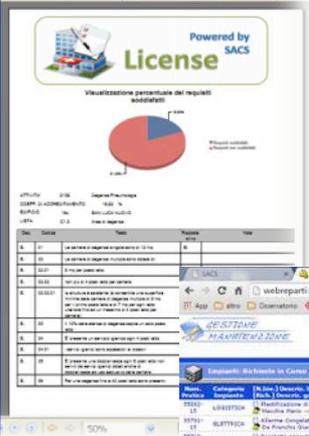
..... the system generate reports in HTML, DWF, PDF format.....

License accreditation



Home - Configurazione e Compilazione - Scelta della Lista - Compilazione Finale

CAPITOLO	CODICE	REQUISITA SISTEMA	REQUISITO	NOTA
5	01	<input checked="" type="checkbox"/>	La camera di degenza singola deve di 12 mq	
5	02	<input checked="" type="checkbox"/>	La camera di degenza multiple sono dotate di:	
5	02.01	<input checked="" type="checkbox"/>	• 8 mq per posto letto	
5	02.02	<input checked="" type="checkbox"/>	• 10 mq per posto letto	
5	02.02.01	<input checked="" type="checkbox"/>	• 10 mq per posto letto per camera	
5	03	<input checked="" type="checkbox"/>	• 10 mq per posto letto per camera	
5	04	<input checked="" type="checkbox"/>	• 10 mq per posto letto per camera	
5	04.01	<input checked="" type="checkbox"/>	• 10 mq per posto letto per camera	
5	05	<input checked="" type="checkbox"/>	• 10 mq per posto letto per camera	
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Maintenance Functions

Impianti: Manutenzione in Corso (30) del 22/04/2015 al 23/05/2015 - CUC (261 LABIN) S.O. PROGRAM. E MONITORAG. - E.C.

Numero Richiesta	Richiesta in Corso	Richiesta Esata	Richiesta Memorizzata	Richiesta Inesistente	Finita/Previsa
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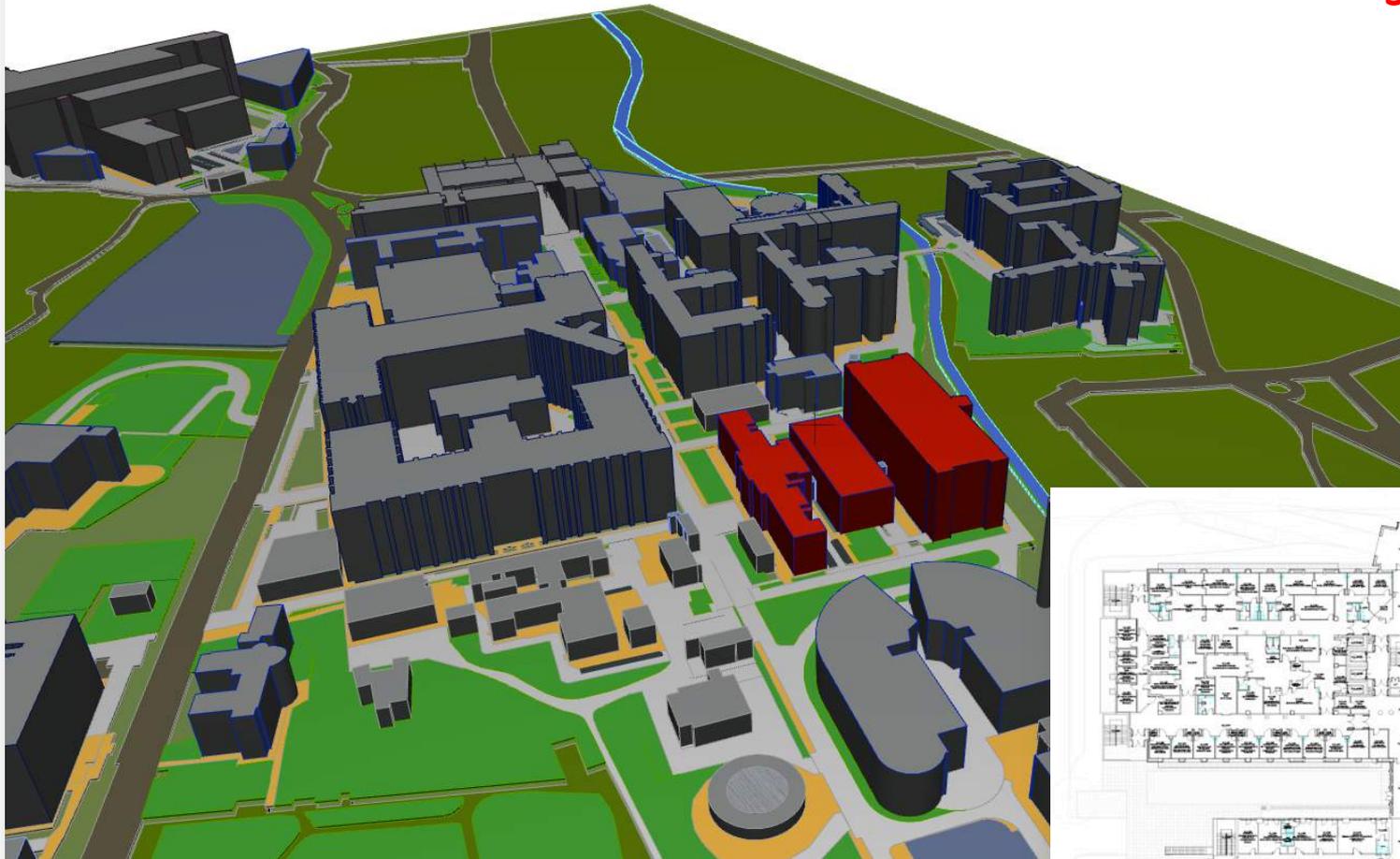
Impianti: Nuova Richiesta di Manutenzione - CUC (261 LABIN) S.O. PROGRAM. E MONITORAG. - E.C.

Tipologia	Manutenzione Inesistente	Stato di Prefessione	DELLA(S) S.O. PROGRAM. E MONITORAG. - E.C.
Descrizione del bene	Zone San. Invernata	Zona	PRENDE
Indirizzo	Telefono	Presidio	PARCOGGIO
Descrizione del guasto (max 2500 car.)	Urgenza	Categoria Emersione	Edificio
	NON / MED / ALV / MAX	SOPRACCARICO DI PRESSIONE SOPRACCARICO DI AEROSOL ELETTRICITA' AL FUGO ODORI: BASSI, OMI, E SORRUPAZIONE INFEZIONE SERVIZI LOGISTICI MECCANICA E AFFIUGO PARACORRIMENTI	Piano
			Manca

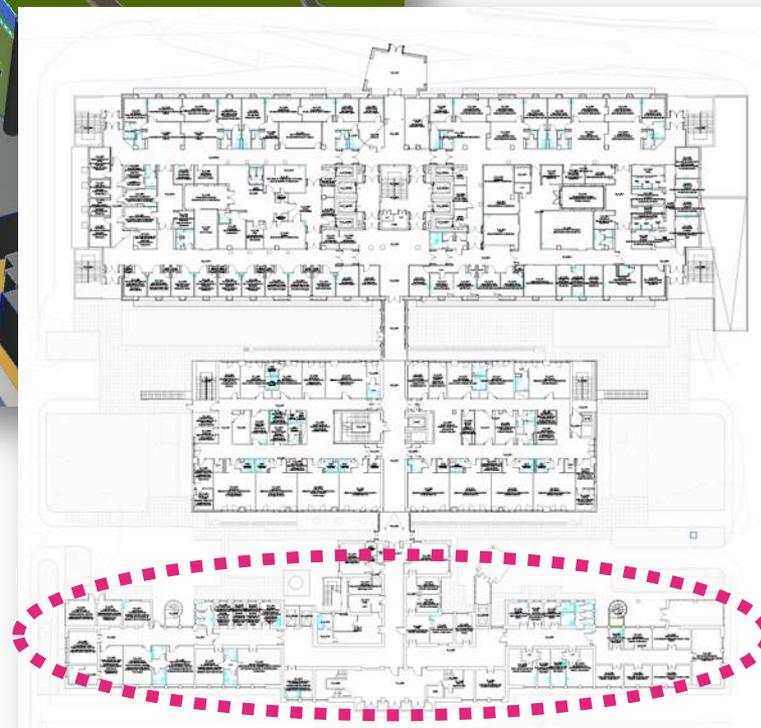
SACS and other modules for accreditation, logistic, facility management, and other applications



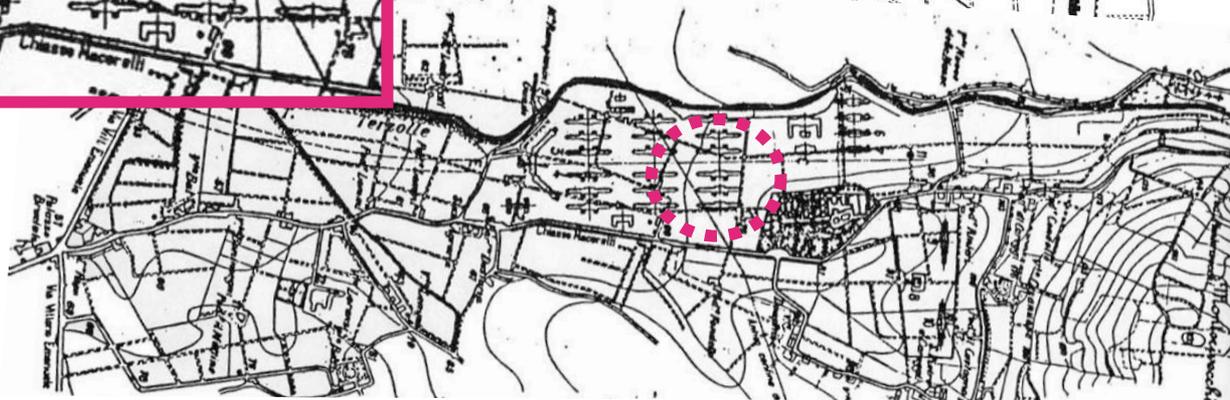
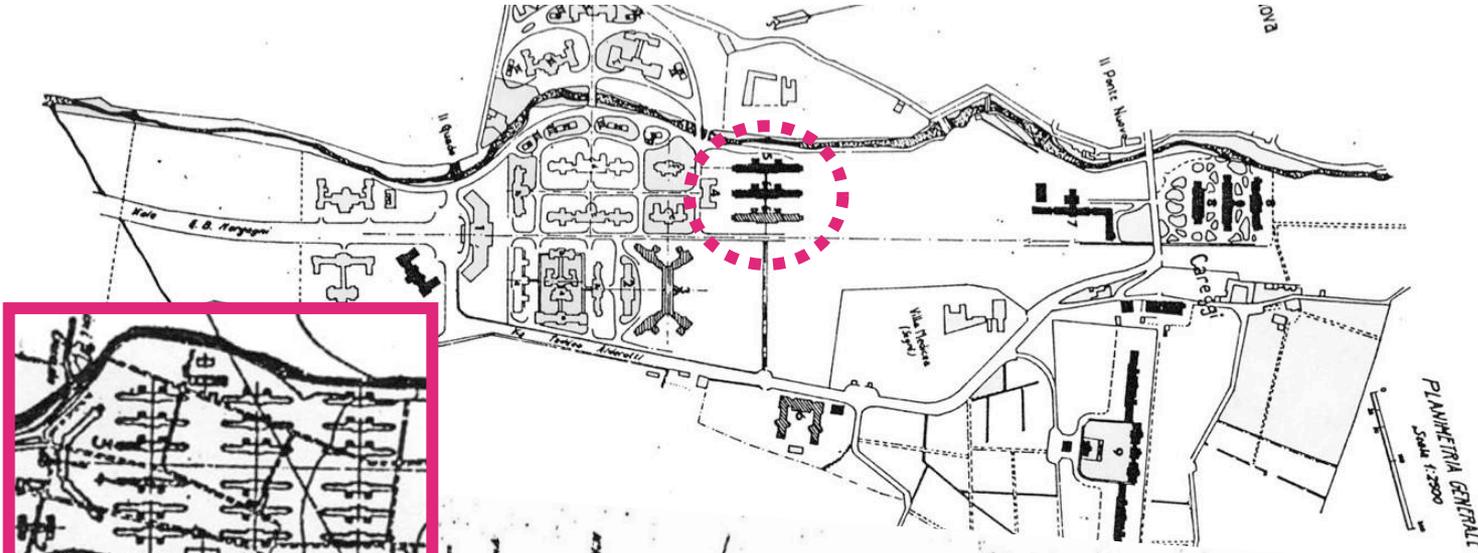
SACS – Other Uses



The oncology center named “San Luca”, which consists of three buildings, as the **case study** for validating the “**STREAMER research**” results.

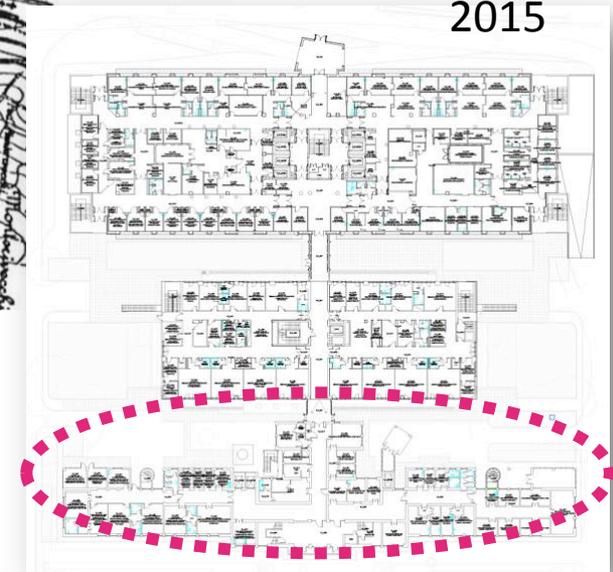


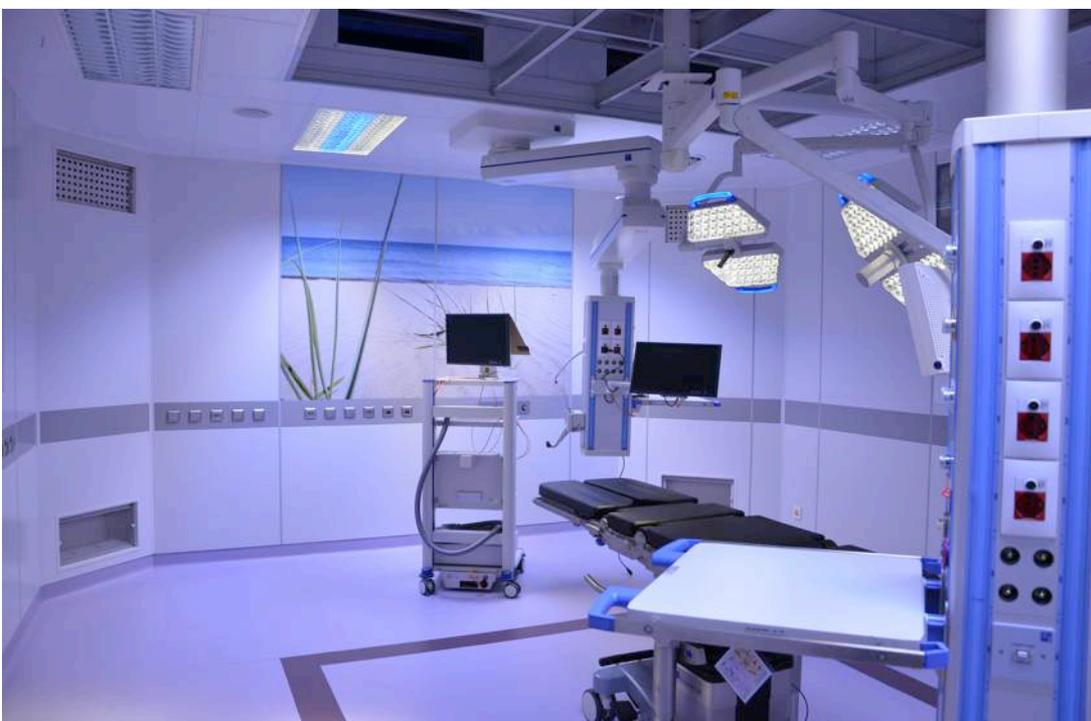
Initially, the **San Luca** Complex included **three equal buildings**. These were organized according to a simple body layout plan, and they defined the model upon which the former plan for all Careggi was **designed around 1920**. The first two buildings of the San Luca Complex were built around 1930, while the last one, which corresponds to the one still existing today, was completed after the Second World War.



1920 Plan

2015





**SUSTAINABLE
PLACES
2015**
September 16-18, 2015
Savona, Italy

2015 - SAN LUCA complex



2D-3D interoperability



LOD 0—2D footprints

on top of digital terrain model

LOD 1—City model

Block model, no roof structures

LOD 2—City/Site model

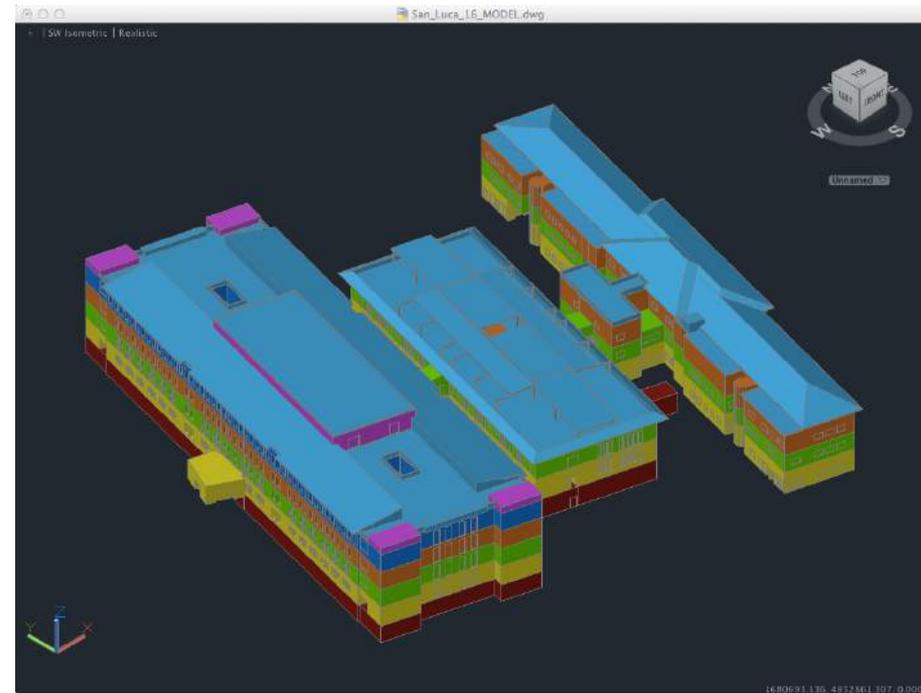
Roof structures, optional textures

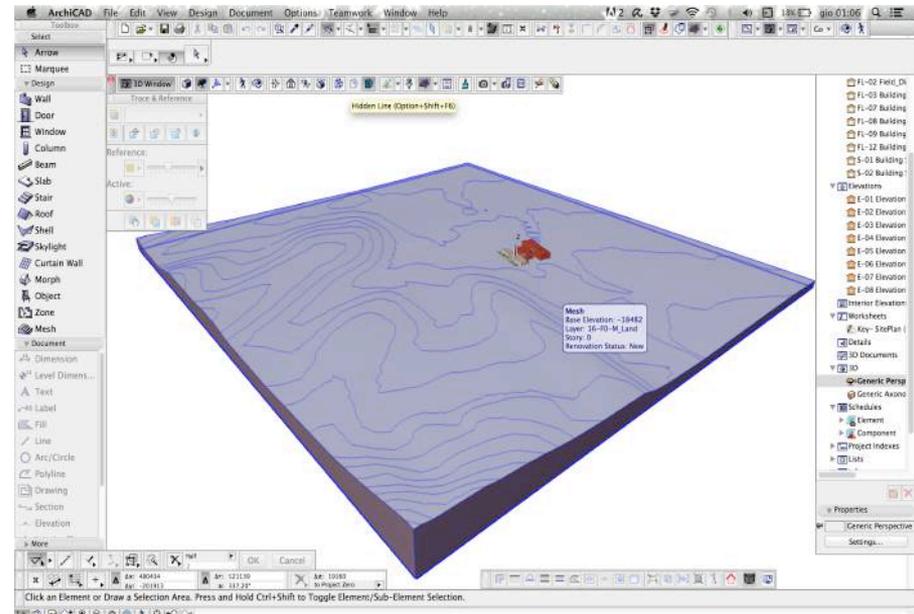
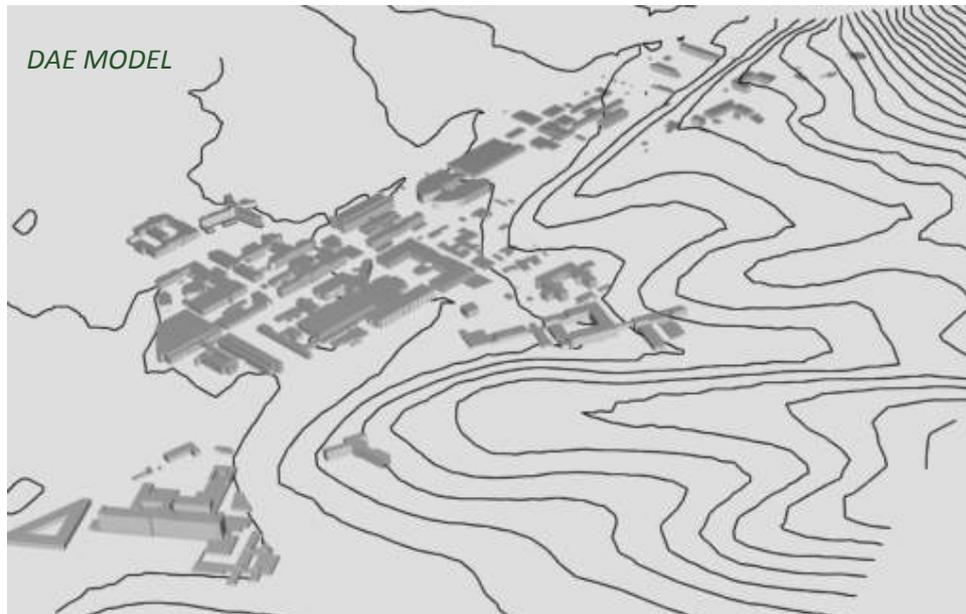
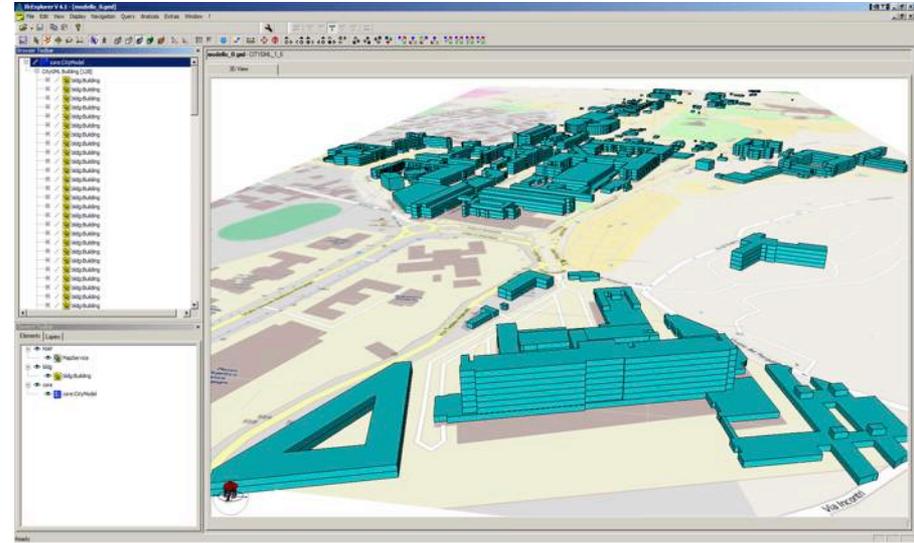
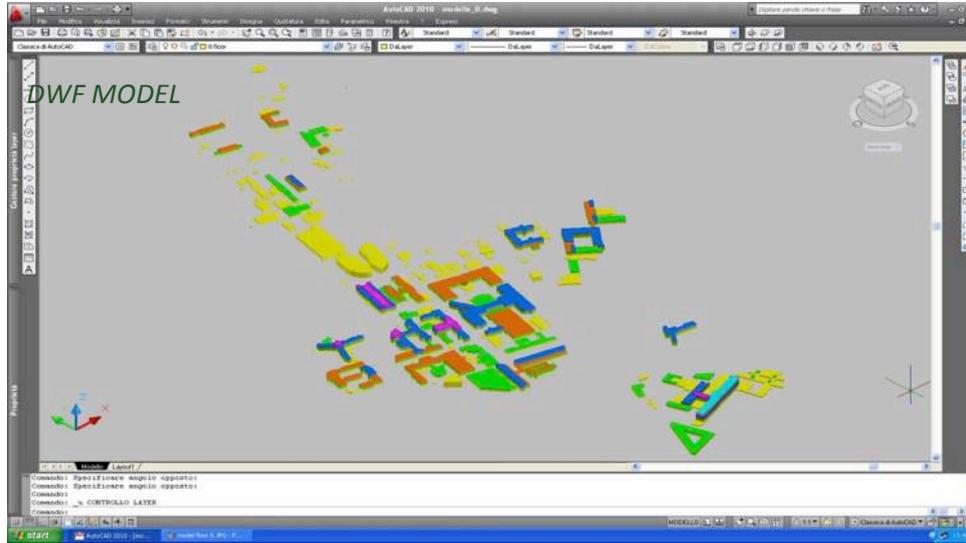
LOD 3—Site model

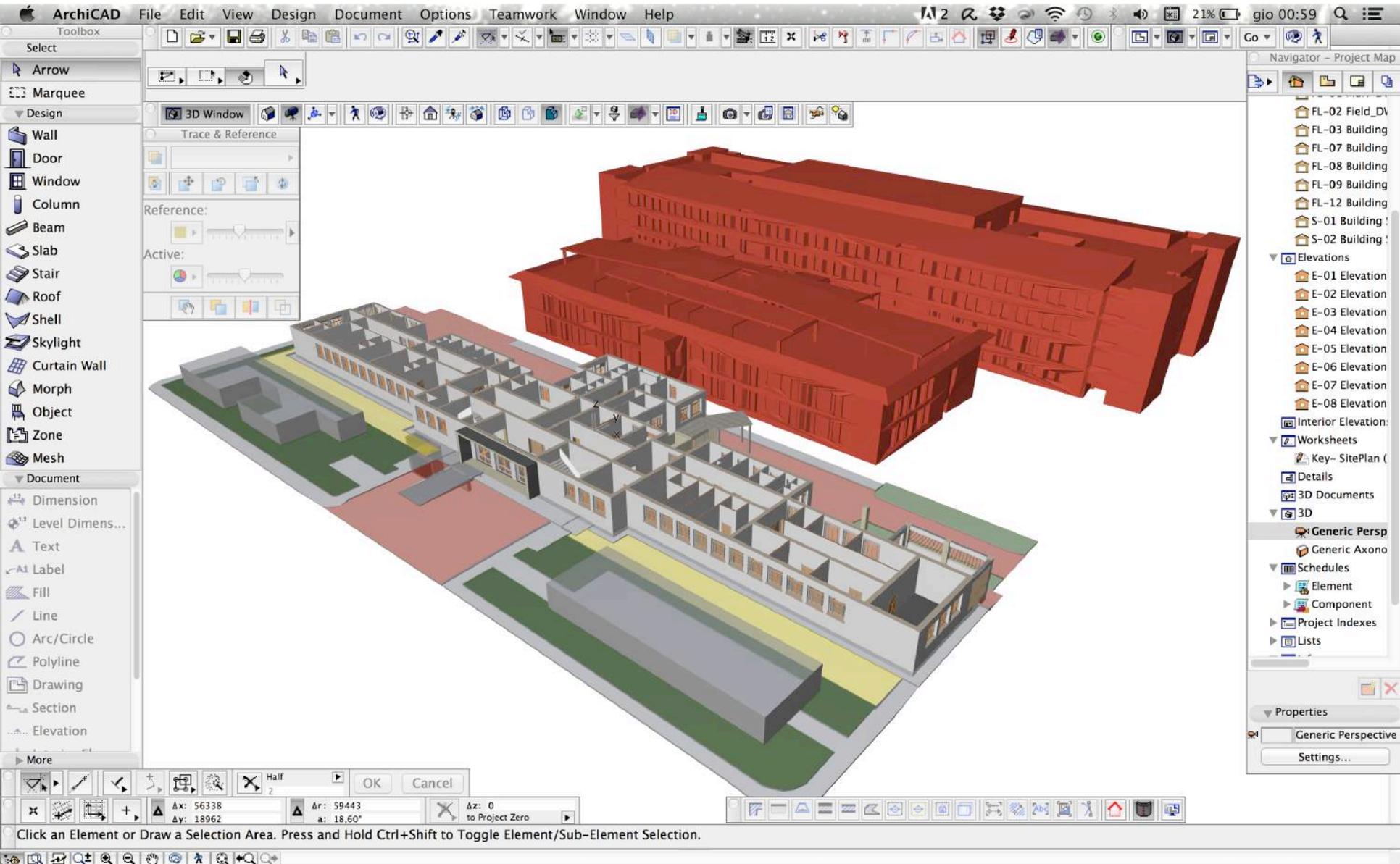
Detailed architectural model

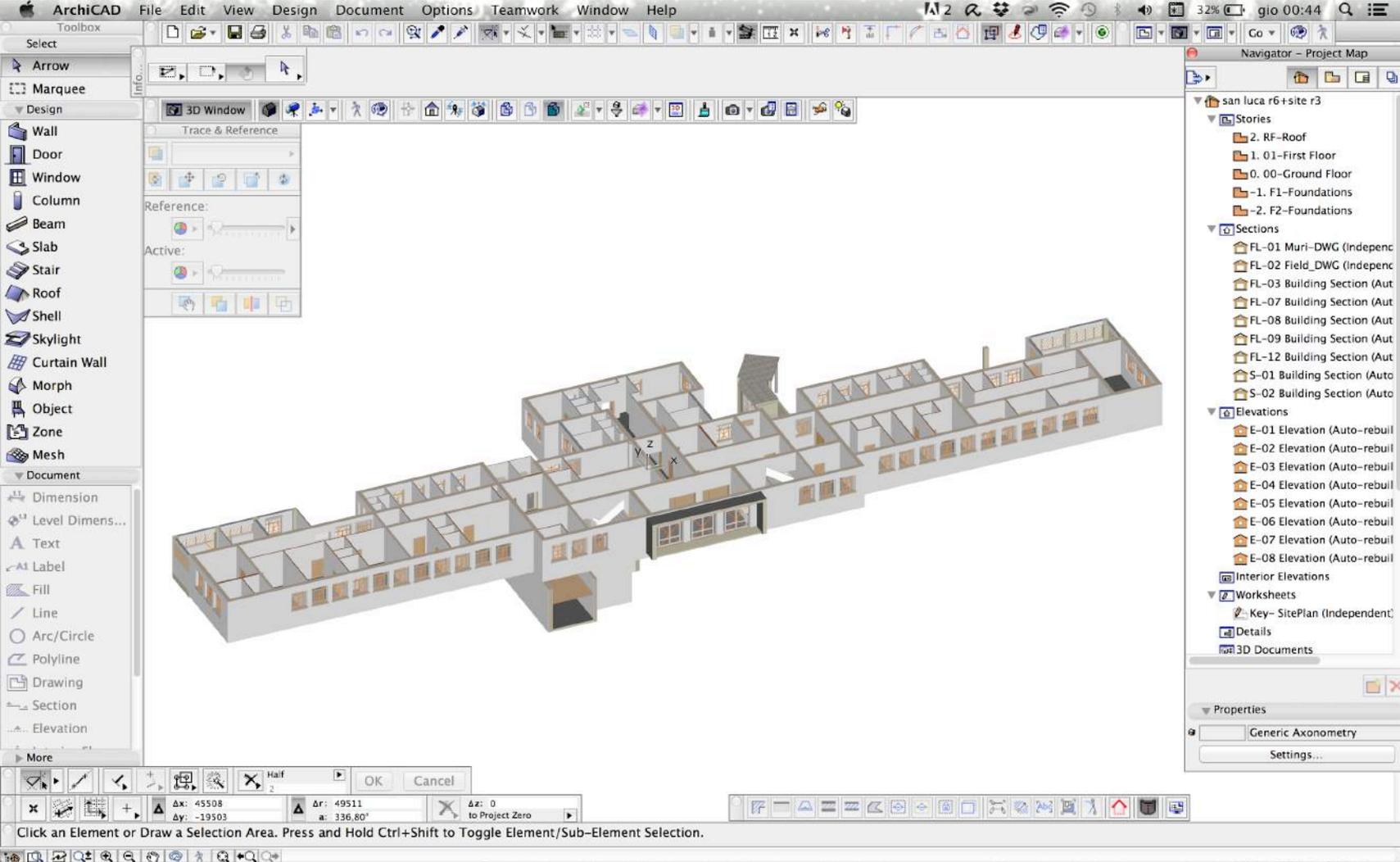
LOD 4—Interior model

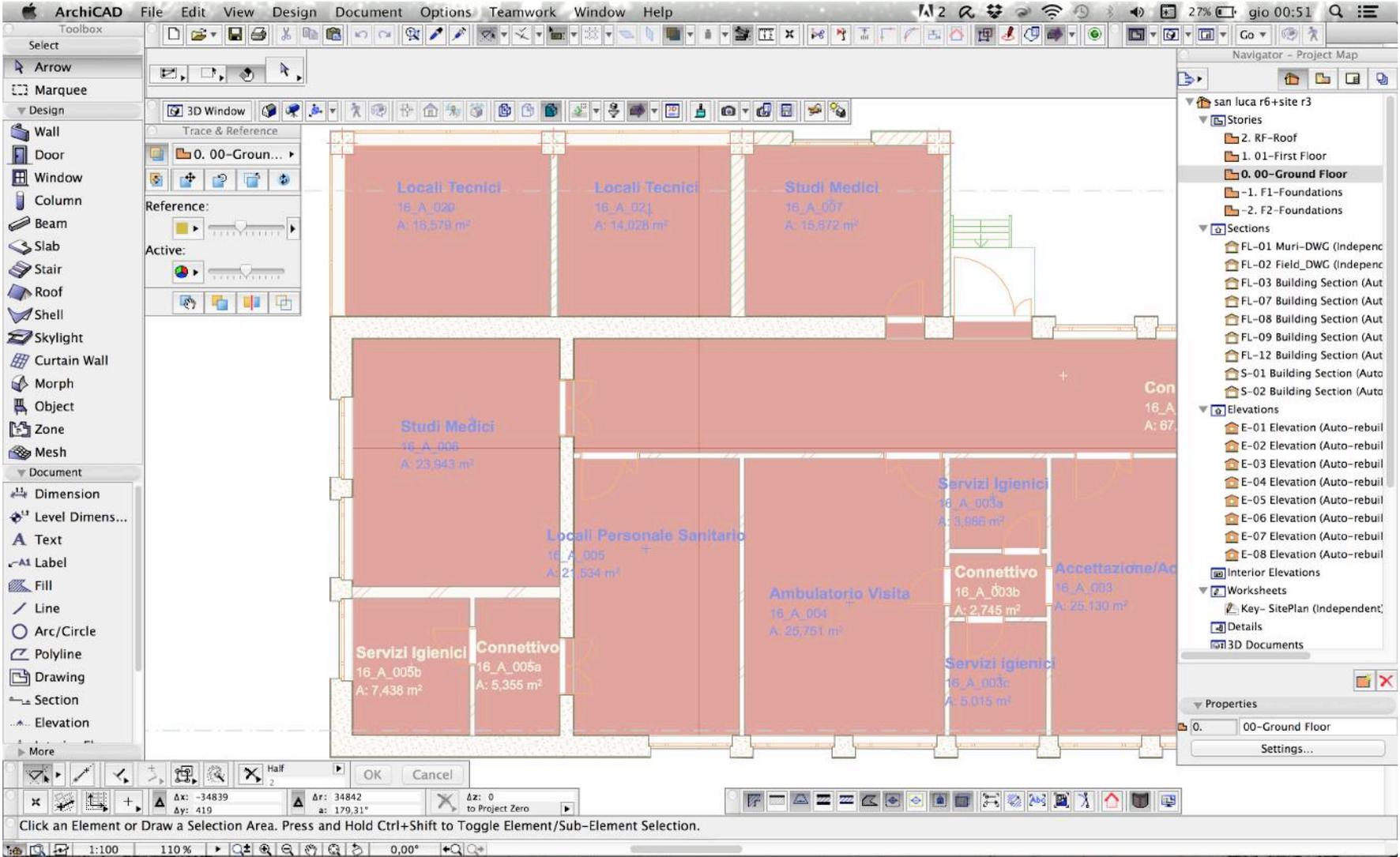
Walkable interior spaces













ArchICAD File Edit View Design Document Options Teamwork Window Help

Navigator - Project Map

- san luca r6+site r3
 - Stories
 - 2. RF-Roof
 - 1. 01-First Floor
 - 0. 00-Ground Floor
 - 1. F1-Foundations
 - 2. F2-Foundations
 - Sections
 - Elevations
 - Interior Elevations
 - Worksheets
 - Key- SitePlan (Independent)
 - Details
 - 3D Documents
 - 3D
 - Generic Perspective
 - Generic Axonometry
 - Schedules
 - Element
 - Component
 - Project Indexes
 - Lists
 - Elements
 - Components
 - Zones
 - Basic
 - Default
 - Rooms/Stories
 - Rooms/Zone Categories
 - Basic (ArchICAD_Library)
 - Default (ArchICAD_Library)
 - Rooms, Elements/Stories 1 (ArchICAD_Lib...
 - Rooms, Elements/Stories 2 (ArchICAD_Lib...
 - Rooms, Walls/Stories 1 (ArchICAD_Lib...
 - Rooms, Walls/Stories 2 (ArchICAD_Lib...
 - Rooms/Stories (ArchICAD_Library)
 - Rooms/Stories (simple) (ArchICAD_Lib...
 - Rooms/Zone Categories (ArchICAD_Lib...
 - Info
 - Project Notes

Properties

san luca r6+site r3 / Zones / Rooms/Stories

23/05/15

Rooms by stories

Story	Room	R. Height	Perimeter	Wall surf.	Measured Area
00-Ground Floor	Connettivo	3,90 m	17,65 m	40,68 m2	11,15 m2
	16_A_042 Locali Personale Sanitario	3,90 m	17,09 m	60,44 m2	16,69 m2
	16_A_001 Sale Riunioni/Biblioteche	3,90 m	24,85 m	85,64 m2	36,39 m2
	16_A_001a Connettivo	3,90 m	6,24 m	17,28 m2	2,32 m2
	16_A_002 Studi Medici	3,90 m	19,92 m	66,21 m2	24,18 m2
	16_A_003 Accettazione/Accoglienza	3,90 m	20,40 m	67,99 m2	25,13 m2
	16_A_003a Servizi Igienici	3,90 m	7,97 m	29,31 m2	3,97 m2
	16_A_003b Connettivo	3,90 m	6,77 m	19,34 m2	2,74 m2
	16_A_003b Servizi Igienici	3,90 m	7,59 m	27,85 m2	3,61 m2
	16_A_003c Servizi Igienici	3,90 m	8,51 m	27,82 m2	4,48 m2
	16_A_003c Servizi Igienici	3,90 m	9,00 m	29,72 m2	5,01 m2
	16_A_004 Ambulatorio Visita	3,90 m	20,60 m	68,79 m2	25,75 m2
	16_A_005 Locali Personale Sanitario	3,90 m	19,52 m	65,75 m2	21,53 m2
	16_A_005e Connettivo	3,90 m	9,56 m	32,90 m2	5,35 m2

page 1

23/05/15

Rooms by stories

Story	Room	R. Height	Perimeter	Wall surf.	Measured Area
	16_A_005b Servizi Igienici	3,90 m	10,95 m	37,35 m2	7,44 m2
	16_A_006 Studi Medici	3,90 m	19,67 m	66,90 m2	23,94 m2
	16_A_007 Studi Medici	3,90 m	15,92 m	53,01 m2	15,67 m2
	16_A_008 Servizi Igienici	3,90 m	7,88 m	21,40 m2	3,26 m2
	16_A_008a Servizi Igienici	3,90 m	4,39 m	13,86 m2	1,20 m2
	16_A_008b Depositi	3,90 m	4,15 m	12,92 m2	1,08 m2
	16_A_008c Servizi Igienici	3,90 m	7,07 m	21,91 m2	2,72 m2
	16_A_009 Spogliatoi	3,90 m	12,63 m	44,36 m2	9,81 m2
	16_A_010 Spogliatoi	3,90 m	10,75 m	37,65 m2	6,48 m2
	16_A_011 Spogliatoi	3,90 m	11,25 m	39,67 m2	6,71 m2
	16_A_012 Spogliatoi	3,90 m	13,40 m	33,52 m2	11,18 m2
	16_A_013 Spogliatoi	3,90 m	23,35 m	83,93 m2	31,73 m2
	16_A_013b Servizi Igienici	3,90 m	9,11 m	24,73 m2	5,08 m2
	16_A_013b Servizi Igienici	3,90 m	9,21 m	25,11 m2	5,27 m2
	16_A_014 Ufficio	3,90 m	14,90 m	52,21 m2	12,27 m2
		3,90 m	15,02 m	51,40 m2	10,59 m2
		3,90 m	16,50 m	52,37 m2	16,74 m2

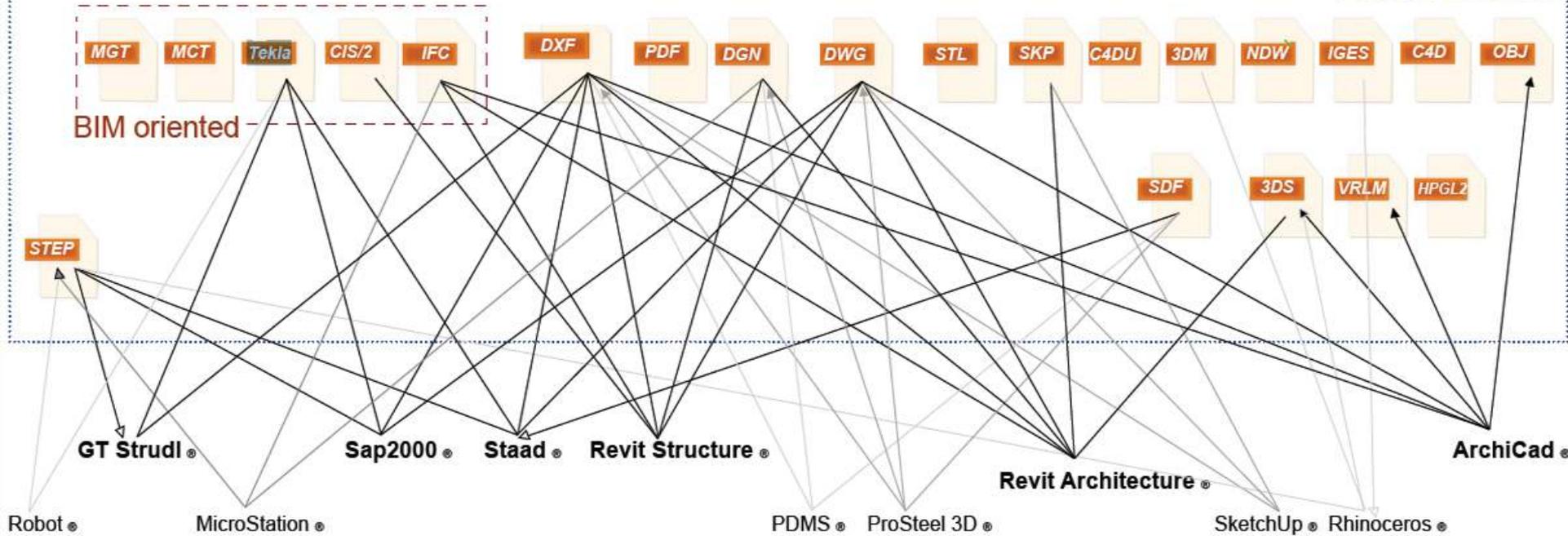
Selezionato 1 di 4, 29,34 GB disponibili



	Bouccoflage layer				Hygienic class					Access and security					User profile				Equipment							label						
	HF	H	D	I	H1	H2	H3	H4	H5	A1	A2	A3	A4	A5	L1	L2	L3	L4	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	C1	C2	C3	C4	C5	C6	C7
building																																
functional area																																
Diagnostic imaging																																
Nuclear medicine																																
Radiotherapy																																
Pre-hospitalization																																
Endoscopy																																
Blood sampling/testing																																
Transfusion centre (blood bank)																																
Rehabilitation																																
Outpatient department																																
Intensive care ward																																
High care ward																																
Low care ward																																
Medical day hospital																																
Oncological day hospital																																
Day surgery																																
Maternity ward																																
Operating theatres																																
Interventional radiology																																
Accident and Emergency (A&E)																																
Medical testing laboratory																																
Anatomical pathology laboratory																																
Internal pharmacy																																
Sterilization centre																																
General storages																																
Kitchen																																
Canteen																																
Medical archive																																
Admission (reception, information, reservation)																																
Garbage room and special materials disposal																																
Mortuary																																
Dressing rooms for staff																																
Health physics																																
Cleaning facilities																																
spatial units																																
Air lock																																
Reception hall																																
Analysis room																																
Ante-room																																
Archives																																
basement																																
Canteen																																
central hall																																
Changing room (personnel)																																
Conference room																																
conservation room																																
consultation + examination room																																
Corridor																																
Day room																																
Delivery room																																
Disinfection room																																
Dialysis																																
Examination room CT																																
Examination room ECG																																
Examination room Endoscopy																																
Examination room MR																																
Examination room Triage																																
Examination room Ultrasound																																
Examination room X-ray																																
exercise rooms (rehabilitation)																																
Group room																																
Heating																																
Internal fire escape stairs																																
Isolation room																																
Kitchen																																
Kitchen cleaning room																																
Kitchenette																																
Laboratory																																
Laundry room																																
Lift																																
Medication room																																
Non-sterile washing room																																
Nursing station																																
Observation room																																
Office																																
On-call staff room																																
Operation theatre, Hybrid																																
patient room																																
patient room (both suite)																																
patient room (day hospital)																																
patient room (intensive care)																																
Personnel room																																
pharmacy																																
Photocopier room																																
Prayer room																																
Preparation room																																
Preparation room for staff																																
Radiotherapy																																
Reception																																
Recovery room																																
Recycling room																																
Radiopanning room																																
Rehearsal room																																
Resting room Patient																																
Resting room Personnel																																
Revascularization/Children's ER																																
Sanitation room																																
Shop																																
shower																																
shower for disabled people																																
Stairs																																
Sterile store, infection control																																
Store room																																
Swimming pool																																
Technical room																																
toilet																																
toilet for disabled people																																
Trauma room																																
Treatment room ER																																
Unpacking room																																
Waiting room																																
Waste room																																



Formati vettoriali



Data	Processing	Software
Topography of the land	Geo-referenced model	Q-GIS 2.8 and Sketch-Up
Network of the roads	Geo-referenced model	Q-GIS 2.8
Network of the technical infrastructure	Geo-referenced model	Q-GIS 2.8
Functional areas and space units (room level)	DWG drawing	SACS
Organisational model (room level)	DWG drawing	SACS
Medical equipment (area of activity level)	DWG drawing	SACS
Shape of the buildings nearby the San Luca complex	BIM model	ArchiCad 18
Structural components	BIM model	ArchiCad 18
Windows and shields	BIM model	ArchiCad 18
Floors, claddings and ceilings	BIM model	ArchiCad 18



CAREBIM – PADIGLIONE SAN LUCA



**SUSTAINABLE
PLACES
2015**
September 16-18, 2015
Savona, Italy



Layer

- A-100
- A-Perimetri
- A-Pollinee
- rt_ofc.2k11



Controlla ordine di rendering
358673 di 358673 bytes di mappa scaricati.

Coordinata: 1680461.8,4852802.1 Scala: 1:1913 Aggiorna EPSG:3003

CareGIS: contain information about the logistical tunnels and technological networks and types of main plant



Quantum GIS 1.8.0-Libose - Careggi 0_GI_rev10

File Modifica Visualizza Layer Impostazioni Plugins Vettore Raster Database Guida

Layer

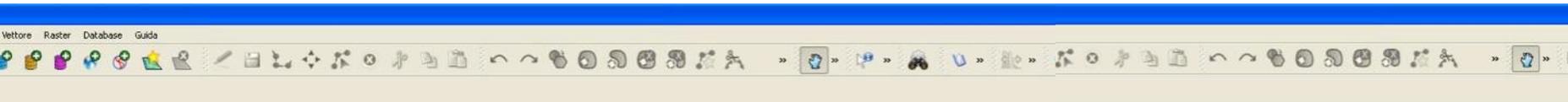
- A-100
- A-Perimetri
- A-Pollinee
- rt_06_2011

338	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#2085E?target="leftFrameDown" { 16_036; 11,41 mq; DU: Ambulatorio; C	NULL	IBCE0
339	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#2085F?target="leftFrameDown" { 16_037; 6,95 mq; DU: Locali Personal	NULL	IBCE0
340	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20860?target="leftFrameDown" { 16_038; 9,20 mq; DU: Ambulatorio; CI	NULL	IBCE0
341	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20861?target="leftFrameDown" { 16_038a; 3,18 mq; DU: Servizi Igiene	NULL	IBCE0
342	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20862?target="leftFrameDown" { 16_039d; 4,08 mq; DU: Servizi Igiene	NULL	IBCE0
343	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20863?target="leftFrameDown" { 16_039; 5,35 mq; DU: Depositi; Class	NULL	IBCE0
344	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20864?target="leftFrameDown" { 16_055; 33,42 mq; DU: Connettivo; CI	NULL	IBCE0
345	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20865?target="leftFrameDown" { 16_043; 39,58 mq; DU: Sale Riunioni/	NULL	IBCE0
346	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20866?target="leftFrameDown" { 16_049d; 13,67 mq; DU: Studi Medici;	NULL	IBCE0
347	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20867?target="leftFrameDown" { 16_045; 13,82 mq; DU: Studi Medici;	NULL	IBCE0
348	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20868?target="leftFrameDown" { 16_044; 18,35 mq; DU: Studi Medici;	NULL	IBCE0
349	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#20869?target="leftFrameDown" { 16_042; 18,55 mq; DU: Depositi; Clas	NULL	IBCE0
350	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#2086A?target="leftFrameDown" { 16_041; 13,82 mq; DU: Studi Medici;	NULL	IBCE0
351	A-Pollinee	AcDbEntity;AcDbPolyline	refresh.html#2086B?target="leftFrameDown" { 16_040; 6,68 mq; DU: Locali Personal	NULL	IBCE0

Cerca

Mostra solo i selezionati Cerca solo i selezionati Maiusc/minus

Ricerca avanzata



Coordinata: 1679513,4853016
Coordinata: 1680377 8,4852926.5 Scala: 1:1724 Aggiorna

Quantum GIS 1.8.0-L... Caregint01_3PG - P... gis stamp - sergio.leo...



Level 0



Quantum GIS 1.8.0-Lisboa - Careggi 0_GF_rev8

File Modifica Visualizza Layer Impostazioni Plugins Vettore Raster Database Guida

Layer

- hatch_0_rev4
- 1_C_GF_Segment_Map_polyline
- polylines
- 100_0
- CTR
- rt_ofc.2k11.qu
- mappa-201307031219180005...
- rt_ofc.2k11

Controllo ordine di rendering
Via più breve

Partenza
(1.68087e+06,4.8523e+06)

Arrivo Controllo ordine di rendering
(1.68084e+06,4.85337e+06)

Criterio Via più breve

Lunghezza 1.28 Partenza

Tempo 1.28029 (1.68087e+06,4.8523e+06)

Calcola

Arrivo (1.68084e+06,4.85337e+06)

Criterio Lunghezza

Lunghezza 1.28029km

Tempo 1.28029h

Calcola Esporta Cancella

ANATOMIA PATOLOGICA

Careggi Smart Hospital

La Sanità del futuro

Coordinata: 1679683,4853438 Scala: 1:7000 Aggiorna EPSG:3003

start AutoCAD 2010 Virgilio Mail - Google C... Quantum GIS 1.8.0-Li... hatch-polylines+ofc... IT 12.32

“Careggi Smart Hospital” App contains a **Way-Finding module** that queries S.A.C.S.© and CAREGIS databases through a web-service and can be **used by the citizens to be informed** about the **arrangement of spaces and paths** based on a number of possible searches done with the key words proposed by the system.



App - (that can be free - downloaded for IOS and Android)

Phd. Arch. Luca Marzi
Department of
Architecture, University of Firenze, Italy
(luca.marzi@unifi.it)