DESCRIPTION OF ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

PRELIMINARY DOCUMENT

Project Name Ektorget
Project Number 20560

HSB organisation/association Brf. Ektorget

APPENDICES

Appendix 1 List of fixtures
Appendix 2 Scale and arrangement drawing – access control system
Appendix 3 Scale and arrangement drawing – AMR system

NOTE: desired unit prices are under "Other"

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This framework description is associated with EL-AMA 12

The separate "AF-del" applies to the contract.

This document is part of a tender document for a turn-key contract.

Generally

General information

The installations are to be carried out to the extent and scale required for a complete, working, and operational facility as per this programme, advice from the authorities, requirements, and recommendations and such that the premises may be used for the intended activities. The phrase "or equiv." applies not only to performance, but to colour and shape, as well. In cases of deviation, the make/product must be indicated in the tender. The client determines equivalence in cases of material replacement.

In addition, the following apply to functions, designs, and execution:

- AMA 12 with the accompanying "Råd och anvisningar" as well as the new additions in "AMA-nytt"
- Swedish Electrical Standards (SEN, SIS, SS-EN, SS-IEC, EN)
- Ljuskultur's planning guide "LJUS & RUM" [LIGHT AND SPACE]
- VGU – Vägar och gators utformning [Road and street design]
- Boverket's Byggregler – BBR [Building Regulations of the Swedish National Board of Housing, Building and Planning]
- National Electrical Safety Board regulations ELSÄK-FS
- SBF 2003 [from the Swedish Fire Protection Association] recommendations on evacuation alarms

All planning is to be based on calculations, where possible. The contractor shall, on request, be able to present calculations for review or for the final inspection, for example.

Specific coordination requirements

The contractor must:

Study critical passages and areas in detail with the use of drawings and descriptions.

Ensure that cables and devices do not interfere with other installations or fixtures.

Check that placement is appropriate as regards accessibility for operations, maintenance, and door hanging.

Coordinate installations with other contractors so as to avoid conflicts during the execution stage.

Personnel qualifications
The contractor must ensure that personnel who are to carry out design work, preparatory work, installations, act as project management, etc. are very familiar with the contract constituent systems.

Spaces/Areas
Equipment shall be set up and arranged such that space is kept open for easy access for servicing and maintenance.

In addition, space or capacity must be available to enable potential additions and expansions of equipment in the future.

Sound
Requirements per Miljöbyggnad [Green Building]; silver level (see www.sgbc.se).

Environmental requirements
Buildings must be certified by the Miljöbyggnad certification system, silver level, version 2.1 (see www.sgbc.se).

The use of materials that contain PVC is to be minimised.

Electric and magnetic fields
Electric fields may not exceed 10 V/m.
Magnetic fields may not exceed 0.2 µT in areas frequented by people.
Electrical fuse boxes in flats may not be placed against a bedroom wall

PROVISION OF ELECTRICITY AND TELECOMMUNICATIONS

Electricity supply
Electricity suppliers are chosen and contacted by the tenant-owners' association.

Electrical services
The network owner is Vattenfall AB, which supplies power at 230/400 V, 50 Hz.

ISPs
Telia, ComHem, or Bredbandsbolaget. Chosen in consultation with the tenant-owners' association and the client.

Meters
Meters must be executed and placed according to the instructions in SS 437 01 40 subsequent to consultation with the grid owner.

Centrally or locally-placed 3-phase meters are used to meter energy for residences, premises, and for common electrical installations.

Electricity meters are to use pulse metering/signal conversion for connections to the main remote-reading system (does not apply to the owner-occupied flats).

All tenant-owners, property owners, and renters of premises sign separate plans with electricity suppliers of their own choosing.
Meters for tenant-owners are placed in cable recesses or in stairwells.

The property
Electrical installations in common areas such as stairwells, basements, attics, laundry rooms, storage, etc. are metered by a common electricity meter on a separate subscription ("the property").

Garage and parking facilities
Electrical installations in garages and for future electric vehicle charging facilities; 10 spaces in the garage.

- Metered by submeter and integrated with the remote-reading system.

TV, telecommunications, and internet services
Fibre cable for data, telecommunications, and television is installed in consultation with the operator that is chosen by the client. Fibre switch is located in the electrical room.

SYSTEM AND FUNCTIONS

Electrical efficiency

The installations are to be designed with low power and energy requirements in order to ensure low operating and maintenance costs.

METERING SYSTEM

AMR system
The AMR system shall meter the following media and meter points:
- Electricity consumption premises
- Temperature via a ref. temperature sensor in each flat
- Electricity for common purposes
- Garage
- Outside power consumers such as exterior lighting
- Hot tap water per flat
- Electricity and hot tap water to the communal laundry room
- Future vehicle charging stations

Note: Water meters per above Lev.EE Montage RE

The system shall be complete with meters, terminals, converters for remote reading, and software (Info-EI).
The system must be made either by Home Solutions or Infometric.

Readings from all of the meters are delivered to a database designated by the client.
The software generates the data for reports, export, and billing.

Documents which demonstrate that the facility is operational and approved by the AMR operator, as well as lists of all the meter points that are operational, shall be submitted to the client upon final inspection.
In order to avoid project delays, it is imperative that the system can be commissioned and run as a trial operation well in advance. The commissioning of systems with up to 150 meter points shall commence no later than three weeks prior to the final inspection.

BOARD EQUIPMENT

General information

Boards are to be made for TN-S systems without neutral screw. Mains shall be connected to boards or cabinets in such a way that a clip-on ammeter can be used easily. Fuse boxes in flats should be placed in wardrobes or halls, if possible.

Building control station

Building control stations must meet the following requirements:

- Sheet metal design
- Omnipolar circuit breakers
- Miniature circuit breakers up to 50A
- Load breaking switches over 50A
- May not be recessed
- Circuits serving alarms and the like must not be connected through a residual current device (RCD)
- All outgoing lines connected to a terminal block
- Spare 20%

Fuse boxes in flats

Fuse boxes in flats must meet the following requirements:

- Recessed, sheet metal painted white, with cover that opens
- Omnipolar circuit breakers
- Miniature circuit breakers
- RCDs type A 30mA
- Integrated multimedia component by Eltecno, Ensto Connect, or equiv.
- Placed with top edge no more than 1400 mm above finished floor. Placement must provide accessibility for wheelchair users.
- Spare 10 %

Main service panels / switchboards in the engineering and utility service room

Main service panels / switchboards are made of material enclosed in sheet metal with backplate; minimum enclosure protection class IP34.

Outgoing circuits are equipped with diazed fuses (threaded fuses) up to 63A. Over 63A, knife fuses are used, which are preceded by load break switches.

Service panel shall be executed such that 1 additional 1 service cable can be connected after completion further modification.

30 % reserve space and 20% reserve arrays of types used.

Main service panel is fitted with critical/medium surge protection. Equipped with alarm output for connection to DUC via 01 networks.

The main service panel shall be designed and executed with:

- Circuit breakers for 10 future vehicle charging stations. 16 A parking spaces in the garage.

Fuse boxes

Fuse boxes shall be enclosed in sheet metal and fitted with a sheet metal bottom. Fuse boxes in residences shall be fitted with protective hood or cover of sheet metal.

The fuse boxes for electricity for common purposes have type A RCDs. All circuits are connected to a terminal block.

Reserve circuits must be provided for snow melting systems (See 63.H/22).

Fuse boxes in flats must be recessed with white lacquered enclosures and sheet metal doors, Ensto Connect with broadband component, equipped with type C miniature circuit breakers.

Fuses in fuse boxes

Fuse boxes with type C miniature circuit breakers, 3-phase circuit equipped with 3-pole miniature circuit breakers. Busbars in miniature circuit breaker boxes must have lengths equal to the requirements for spare modules and always equal to the full width of the box.

Auxiliaries

Requirements for reserve arrays and modules are **in addition to** other requirements for preparations and/or reserves.

Auxiliaries in MCB (miniature circuit breakers) box

MCB boxes generally have at least 20 % reserve arrays and 30 % reserve space, though at least 12 modules.

MCB boxes in flats must have a minimum of 4 reserve modules.

Cabinets

In panels where contactors, automatic staircase lighting switches, timers, relays, transformers, etc. are found, these are installed in a separate cabinet or box as an integral part of the panel.

Terminal blocks and neutral bars are to be placed such that the wires can easily be connected and outgoing parallel cables can be easily identified.

All wires in incoming and outgoing cables shall be connected to a terminal block.

All devices shall be connected to terminal blocks, easily accessible for service, and hot swappable.

Relays shall be of plug-in type.

All main and auxiliary contacts, including reserve contacts for components in the cabinet, must be connected to terminal blocks.

Terminal blocks for extra-low voltage shall be separate from terminal blocks for low voltage and clearly marked with a label.

Cabinets must have 30 % reserve space, 30 % reserve terminal blocks, and 20 % circuits in reserve.

All cabinets are to be provided with documentation in a sleeve on the interior side of the door/cover or in a holder on the wall, this also applies to cabinets integrated with fuse boxes.

Cabinets shall have lighting and a maintenance socket separately connected.

Spare fuses, etc.

A spare fuse cabinet for threaded and cartridge fuses containing 30 % spare fuses is to be set up in the electrical room.
At each box with threaded fuses, holders are to be set up for spare fuses and contain 20 % of fuses that are used in reserve, though at least 3 of each size.

Cartridge fuse handles are to be hung at each box/cabinet that contains cartridge fuses.

DUCTING

Electricity and telecommunication installations are predominately hidden with recessed electric conduits and boxes.

Secondary rooms and garages make use of ducting with cable racks and/or cable conduits beneath the mat.

Ducting in equipment rooms is performed by SÖE [the control and monitoring contractor].

In flats, stairwells, entrances/lobbies, laundry rooms, etc., all ducts shall be made with recessed tubing and boxes.

Socket boxes for sockets are not acceptable in flats.

WIRING SYSTEM

Mains are to be executed as TN-S systems (5-conductor systems). Current-loaded lines such as the main and final circuits must be separated from the lines for control, IT (broadband, VoIP, IP-TV), access control, laundry room booking, entry intercom, etc., and where several lines are installed in a parallel configuration.

Where there are risks for interference due to capacitive and inductive effects, lines may not be installed in a parallel configuration with less than 50 mm spacing.

The wiring system shall be replaceable throughout its entire length. All wiring in walls shall be located in conduits. Surface-mounted wiring is not acceptable in flats, lobbies/entrances, or stairwells.

Mains consist of cable types AXQJ, FXQ/XMJ, EXQJ, and FXQJ. House wiring cable type EQLQ for surface-mounting and twisted FQ wiring in conduits.

Mains and housing wiring cables for equipment that requires fire-rated cables in accordance with fire protection documentation.

The following schematics per regulations SS 4364000 Table 52A.3 are not used:
3, 4, 5, 6, 7, 10, 12, 15, 16, 36, 43, 45, 50, 52, 57, 58, and 71.

SITE EQUIPMENT

Tools, spare cartridge fuse links, etc., included in the contract for the electrical facility's operation and maintenance shall be provided in the electrical rooms.

Where two or more appliances are installed adjacent to each other, they must be installed in a joint cover frame.

The contract shall include complete installation of site equipment in accordance with, and to the extent of, SS 437 01 46.
Switches and sockets shall be manufactured by Eljo, Elko, Gira, Jung, Ensto, Busch-Jaeger, Norwesco, or equivalent.

The same brand and series must be used throughout, where applicable.

All items such as sockets, switches, etc. shall be recessed in walls in flats, stairwells, lobbies/entrances, laundry rooms, etc.

Switches

White screws for fastening in boxes.

Enclosed switch for housing wiring cables. Large rocker switches in all areas of residences.

Fixtures and outlets on balconies and patios are operated by switches with position indicators. Switches are placed on the interior wall adjacent to balcony and patio doors.

Wall sockets

White and child-safe for fastening with screws in boxes.

Enclosed socket for surface-mounted installation.

Angled socket boxes above kitchen worktop.

The space for a microwave oven is fitted with one wall socket.

2-phase outlet for stove/built-in hob.

The space for an oven is provided with one wall socket.

Two separate single sockets are to be installed in the bathroom for a washer and a dryer.
The bathroom shall have a wall-mounted socket next to the mirror and fitted with a cover.

Sockets for microwave, washer, dryer, fridge, and freezer must be on separate miniature circuit breakers.

Outlets in bedrooms are placed at least 0.7 m from corners in which a wardrobe can be located.

One double plug "toaster socket" is installed at the kitchen table.

Socket on the patio (controlled by switch with position indicator).

One 4-way socket installed in the multimedia points of flats.

Wall socket for iron fitted with switch and timer.

Wall sockets with electronic timers are installed in the laundry room and at kitchenettes in boardrooms.

Sockets for cleaning in stairwells, 230V 16A via separate RCDs. Operated by a timer located at the slop basin for mop water on the ground floor.

Socket for wheelchair charging must have an integrated RCD.

A socket is also installed above bathroom countertops.

A double wall socket is installed at the data/telecom/TV socket.

Wall sockets in the garage are connected to the same circuit as lighting.

Sockets for a courtyard Christmas tree are mounted on light poles or in bollards. The socket is connected to the exterior lighting via a separate change-over-switch in the fuse box.

Installed in the property's storage room and all engineering and utility service rooms / equipment rooms is one 3-phase 16A CEE socket on separate circuit and one 1-phase 16A maintenance socket on separate circuit.

On the wall behind all telecom and IP stands, two double wall sockets are mounted.

OTHER

Technical information in tender

The contractor shall on request present the quoted material that is intended to be used.
Tenders shall specify whether quoted equipment fits within specified areas.

Unit prices in tender

The tender shall include unit prices due/deducted for the following:

- Access control system for one door zone, included part of the central unit, and required programming.
- Snow melting system according to 63.H/22 "Snow melting – roof"
- Electric heating in wet room floors of flats (comfort). See also 63.H
- Installation of one door opener. See also WHB.32

61 DUCTING

Ducting for telecommunications systems
A cable ladder adapted for a mounting stand is to be installed in the telecommunications room.

Ducting to flats
Ducting to flats must be arranged via cable shafts with lockable hatches/doors accessible from the stairwell on each floor. The shaft is mounted with cable racks or anchoring iron.
The shaft must also have space for residential billing meters.

Ducting for electric heating systems – heating cable
See 63.H/22

Ducting for future car charging in the garage.
Prepared with ducting for future electric vehicle charging stations from electrical rooms to ten intended locations.

61/2 DUCTING, CABLE/WIRE RACKS, AND CABLE TROUGHS

Cable racks are used in engineering and utility service rooms and above false ceilings while visible installations use white cable troughs.
Upon contract completion, cable racks and troughs must have at least 25 % reserve space.
Telephony and data cables must be laid in separate telecom troughs or in separate sections of cable racks/troughs.

61/3 ELECTRICITY AND TELECOMMUNICATIONS DUCTING CONDUITS AND FLEXPIPES

Installation is predominately recessed conduits and boxes.
A system of conduits that terminate at each meter point must be arranged for individual metering of tap water.

Ducting to outside control sensor is carried out in consultation with the control supplier. Placed on the façade facing the courtyard at stairwell 5.

SBJ Cable penetrations

Cable and pipe penetrations through the ground/foundation wall are made water and gas tight.

SBN.112 Plastic tube cable protection

In-ground cable protection tubes have smooth interior sides and tight joints.
Cables beneath paved areas must be located in pipes.
Conduits fitted with a pull wire and address label and sealed at the end.

In-ground installations shall be made in accordance with SS 424 14 37 and the applicable EBR standards.

63.BCB/1 LOW-VOLTAGE ALTERNATING CURRENT NETWORK – NETWORK IN GROUND OR IN BUILDINGS

Where there are risks for interference due to capacitive and inductive effects, lines may not be installed in a parallel configuration with less than 50 mm spacing.
Current-loaded lines such as main and final circuits must be separated from the lines for control, monitoring, telecommunications and data, where several lines are installed in a parallel configuration.
The electric supply mains are to be a TN-S-system.

63.F ILLUMINATION/LIGHTING SYSTEM

LIGHT FIXTURES

Fixtures in residences must be selected from

- Fixture list customised for the project

Fixtures in property spaces, garages, etc. shall consist of fluorescent / compact fluorescent fixtures.
Discharge fixtures must be used for pole-mounted outdoor lighting.

Ballasts and light sources

Fluorescent fixtures shall be fitted with T5 fluorescent lamps. Compact fluorescent fixtures shall be fitted with HF ballasts. Outdoor fixtures shall be fitted with halide lamps, Ra-index > 80.

Colour rendering in flats must be 2700-3000K.

Colour rendering within the property must be 3000K.

Outdoor illumination requirements

Car parks and walkways must have an average illuminance of at least 10 lux. Any dark corners that arise must be provided with additional illumination.
Proposed placements based on landscape drawing (Preliminary Document dated 08/26/2013 prepared by Tema - landscape architects)

LIGHTING ACTUATOR

Control and monitoring systems for outdoor lighting

Outdoor lighting shall be controlled by a combination of light relays and timers.

Control and monitoring systems for stairwells, corridors, and open areas

Stairwells shall be controlled by presence detectors and light relays. Fixtures may not be completely turned off in dark rooms or in front of elevators; they shall be dimmed to 5-20% when no persons are detected. Rooms with daylight must be fitted with light relays.

Control and monitoring systems for the garages, laundry rooms, storage, and similar areas

Garages, laundry rooms, storage, etc. are to be controlled via presence detection.

Control and monitoring systems for flats and premises

Flats and premises are traditionally operated by switches

WIRING SYSTEM

Electricity supply mains

Stairwells and corridors

Two subsequent lighting points are to be connected to separate circuit breakers and RCDs in stairwells, corridors, and parking garages without daylight.

63.FH EMERGENCY LIGHTING SYSTEM AND BACKUP LIGHTING SYSTEM

Emergency lighting shall be executed according to BBR [Boverket's Byggregler – Building Regulations of the Swedish National Board of Housing, Building and Planning] and the fire protection specifications designed for the project.
In addition to the above requirements, all stairwells are to be provided with at least 1 emergency light fixture and 1 emergency plan; as required by the clients due to dark stairwells.
Fixtures must have built-in batteries and a self-testing feature.

63.FJ Lighting system for directional signage, etc.

Shall be executed according to BBR [Boverket's Byggregler – Building Regulations of the Swedish National Board of Housing, Building and Planning] and the fire protection specifications designed for the project.
Fixtures must have built-in batteries and a self-testing feature.

63.H ELECTRIC HEATING SYSTEM

Electric heating system in floors adjacent to cold areas

The floors of residential spaces situated adjacent to building exteriors or cold areas are heated by a heating cable that is governed by a thermostat and sensor located in the floor. The system shall be connected to the building control station.

Electric heating in wet room floors (comfort heating)

Electric heating in wet room floors is sold as an option. Unit price is provided in the tender. Minimum power 80 W/m²
Is to be governed by a thermostat with sensor located in the floor. Room thermostat placed 1,000 mm above the floor in a joint cover frame for light starter.
In-floor heating cables may not be self-limiting.

Towel warmer

Bathrooms are fitted with electric towel warmer, chrome-plated, "Dryson Practic krom". The towel warmer must have an on/off switch. Towel warmer may not cover transmission losses.

63.H/22

Electric heating system – heating cable for ground heating, frost protection, etc.

GARAGE

Garage ramp is equipped with a heating cable system for ice and snow melting. Located beneath the port and about 12 m into the ramp. (See architectural drawing)

The control system must be the Eberle brand or equivalent.

Manufacturer's instructions must also be followed for installation.

The heating cables shall be governed by moisture and temperature sensors.

Potential-free alarm contact with make/break function in the control box for alarms – triggered RCD, interrupted sensor, undercurrent value – is linked to the building CCU via 01 network.

A cable schematic shall be mounted adjacent to the cabinet which indicates the loop number, line section, and power of each cable.

SNOW MELTING – ROOF, ETC.

For snow melting in rainwater downpipes, rain gutters, and suspended rain gutters: only includes preparation with circuit breakers in the building control station, ducting to appropriate points for connecting heating cables, and placement of moisture and temperature sensors.

Unit price (see Other technical information in the tender) is submitted for completed and full installation as shown below.

The control system must be the Eberle brand or equivalent.

Manufacturer's instructions must also be followed for installation.

Prior to commencing work, electrician and supplier must provide HSB's installation manager the opportunity to go through the intended installations.

The heating cables shall be governed by moisture and temperature sensors.

Potential-free alarm contact with make/break function in the control box for alarms – triggered RCD, interrupted sensor, undercurrent value – is linked to the building CCU via 01 network.

A cable schematic shall be mounted adjacent to the cabinet which indicates the loop number, line section, and power of each cable.

63.J MOTOR DRIVE SYSTEMS

For HVAC equipment, sprinklers, and lifts: only includes mains to each cabinet

Observe the requirements in the fire protection specifications for mains. In addition to the above, the following units must be fitted with final circuits and local isolating switches and then connected:

- 230 V fan in the laundry room, with control from the drying cabinet.

64 TELECOMMUNICATIONS SYSTEMS

Board equipment
Board equipment is installed on mounting racks in electrical rooms. Power supply equipment must be permanently connected to the fuse box. Power supplies are to have 20% spare capacity, unless otherwise indicated below.

Wiring system
Electric supply mains are to have 30% spare capacity in respect of feeders between racks and from racks to distribution blocks.
All wires, including redundant wires, shall be connected to terminal blocks at both ends.
Terminal blocks installed anywhere other than on mounting racks shall be mounted in protective boxers with covers.

Site equipment
All site equipment (appliances, etc.) shall be fitted with coupling clamps for ingoing and outgoing wires.
Appliances, sockets, etc. shall have the same colours as the appliances indicated in Chapter 6, "Site equipment – building".

Telecommunications equipment racks
Racks for VoIP, Data/TV systems, and access control systems must be equipped as necessary in electrical rooms and cable recesses.

64.BC MULTIFUNCTION ON-SITE NETWORK

Common electric supply mains for telecommunications, control, monitoring, etc. This includes the installation of a structured common electricity supply main (so-called 01 network) for control (timer controls, etc.), etc.
The electric supply mains shall be constructed with paired cables and extend from the cross-connection racks in electrical rooms where distribution network is installed to the distribution block in each electricity room, equipment room, at the CCU etc.

64.BCD/1 MULTIFUNCTION NETWORK FOR TELECOMMUNICATION SYSTEMS – ON-PREMISES NETWORK FOR DATA TRANSMISSION

General information
This contract includes the installation of an internal data and telephone communications network for the property.
Triple-play, as well as TV.

Scope
The contract includes the supply and installation of the following components:
- Rack
- Distribution Panel
- Electric supply mains
- Double socket (modular jack)

In addition, it includes connecting, measuring, marking, and registering of the network.

System and functions

The system shall be executed as a general on-premises data and telephony network with category 6 wiring and outlets for TV, telephony, and data.
Sockets in flats must consist of two double sockets in the living room and one double socket in the kitchen and each bedroom.
Sockets on the property must consist of two double sockets in the electricity room (access and meter reading) and one double socket in the sprinkler room, substation, and each fan room.
The supply and distribution network shall be used for the connection of telephone, computer, or modem links.
The network structure must be vendor-independent and comply with applicable international standards ISO/IEC 11801 2nd edition, EN 50173-1 (2nd edition), and TIA/EIA-568-B. The distribution network shall also meet the requirements of PSACR according to EN 50 173, Perm.Link, Class E.

Board equipment

Racks shall be installed in electrical/telecommunications rooms, basements, and where incoming fibre and telephone cable are connected to the requisite equipment.
Separate patch panels are mounted for property sockets.
Each rack shall include a "cable marshal" and equipment to take the load off of cables.
Panels in flats must be integrated with fuse boxes from EnstoConnect or equiv. All sockets in flats must be patched. The left socket must be for telephones and patched through the requisite number of splitters.

Wiring system

Backbone between KK racks (crossover) in the same tenant-owners' association shall consist of fibre cable.
The distribution network must be a separate system and executed as a star network to and within each flat with unshielded twisted-pair cabling cat 6.
Line between KK rack and multimedia panel in each flat shall consist of 2 UTP cat. 6
Data lines in mounting racks must be terminated in socket panel with RJ45 jack. Fibre optic cables for data are terminated in fibre box with SC fittings. Fibre box must be fitted with SC duplex adapters.
Intersections between cables in the telecommunications network and high-voltage cables must be perpendicular.

SCF

TELECOMMUNICATIONS AND DATA CABLES

Distribution cables

Distribution network shall consist of balanced, 100Ω unshielded twisted-pair cabling with 4 pairs of UTP, cat. 6, Class E.

SCJ

FIBRE OPTIC CABLES

Cables are run unspliced between connection spaces. Horizontal runs are made in conduits. Cables in conduits on cable racks are mounted on the underside of the rack.
About 5 metres of cable is rung at each end of connection spaces as a reserve length for any damages. Suspension arrangements according to the manufacturer's installation instructions are included. All fibres are contracted with adhesives and SC contacts. Pigtails are welded. Termination boxes are to be included.

SDC.4221

Cross-connection panels in communication network or the like

The panels must be mounted in 19" racks. The panels must be unshielded with 24 or 32 ports. When the contract is completed there must be at least 25% connectivity in reserve.

Fibre cable panels are also installed in the racks.

The requisite number of patch cables to each flat must be included.

TGD.2

Data network outlets

Pairs – Networks
Sockets must be double 8-pin modular jack RJ45 female, Category 6, Class E per SS-EN 50173.

TFB.12

Telecommunications socket

Sockets must be 8-pin modular jack RJ45 female, Category 6, Class E per SS-EN 50173.

64.CB

Telephonic alarm systems

Multicom Security TOR III alarm dialer with spare battery via TCP/IP and GPRS wireless auxiliary route to emergency services for all characters for sprinkler alarm in garage.
To be mounted on a rack in electrical room / telecommunications room.
EE shall assist client with the ordering of subscriptions, e.g. Multicom IPBAS III.

64.CBB

FIRE DETECTION AND FIRE ALARM SYSTEM

Scope as per fire protection specifications.
The flats must be equipped with battery-powered fire alarms with a service life of at least 10 years.

64.CBH EMERGENCY SIGNAL SYSTEM

System and functions
Emergency signal systems shall be installed for HWCs and resting rooms. A sent call is indicated optically and acoustically outside the door; forwarding is not required.

Emergency signal from lift
Emergency signal from lift is included in the lift contract

Power supply
The system must be connected to the common power supply equipment described in 64.MB.

64.CCB ENTRANCE AND ACCESS CONTROL SYSTEM

Entrance doors
Each building entrance is fitted with electric locking with electric striking plate. It shall remain open for the duration of the opening pulse. The striking plate shall then return to the locked position, even if the door has not opened.
The door will be locked during a power outage.
Electric striking plate is made for 24 volts DC and is a strong fixed type in a corrosion-resistant version for outdoor use.

Touch-free locking system
The entrance door shall be equipped with a PC-based access system. The system shall be equivalent to RCO R-CARD 5000 or Aptus xx700.
Card readers should be touch-free.
The system shall be equipped with a card reader, electric lock, and an open button. For scope see appendix ? network schematic – access system

Other exterior front doors
Front doors shall be equipped with a PC-based access system. The system shall be equivalent to RCO R-CARD 5000 or Aptus xx700
Card readers should be touch-free.
Touch-free scanning is set up at the following doors: For scope see appendix ? network schematic – access system

Other front doors are equipped with latch locks or cylinder dead locks with 6 latching pins.

Doors inside the building
Doors shall be equipped with a PC-based access system. The system shall be equivalent to RCO R-CARD 5000 or Aptus xx700.
Card readers should be touch-free.
Touch-free scanning is set up at the following doors: For scope see appendix ? network schematic – access system

Other internal doors are equipped with latch locks or cylinder dead locks with 6 latching pins.

Laundry room
Reservation of laundry room must be possible via electronic information board in each stairwell entrance or via the web.
The machines shall be blocked with the current booking period.
The system shall be connected to the HSB operations office where software for the selected brand will be installed.

Garage port to collective garages
Electronic access systems with touch-free scanning of cards or tags. Telephonic control system. Automatic closing. Traffic light. Decoupled in the event of power failure.

Scope of touch-free locking system.
The access control installation will mainly consist of: panel equipment with complete program software and power supply

- Connection for data transfer to/from a remote location via internet connection.
- Electric supply mains
- Card reader
- Entrance intercom device
- Laundry room booking system
- Door open buttons
- Digital display screen in stairwells, connected to the web
- Access tags: Supplied by the tenant-owners' association, 4 per flat, programmed by the electrical contractor in consultation with the association's designated administrator
- Programming of the system with tenant(s) name and phone number.

64.D TELEPHONIC SIGNALLING SYSTEMS

64.DBB Entrance signal system

Entrance signal system for entrance doors from stairwells shall be mechanic and included in the door delivery
Electric ring conduit with two note "Ding Dong" for entrance doors from stairwells and outer doors to residences, where indicated under 44.CC.
Flats with two floors shall have a two-note sound on both floors.

64.DBZ.2 Monitoring system for faults/operations monitoring

EE includes the connection of fault/operations alarms from, among others, Power supply equipment installation.
64.DBC connected via installation
64.BC, "01-network", to terminal blocks in the in electrical room / telecommunications room plan ? for forwarding to CCU.

System and functions

Technical alarms are transferred to the operational monitoring centre, such as fault alarms from the power supply equipment, temperature alarms, operation alarms, and fault monitoring to the telecommunications room.
Multifunction network is used for signal systems.

64.E TELECOMMUNICATIONS SYSTEM

64.EBD Entrance intercom

Entrance intercom shall be integrated with the access system and able to communicate via VoIP to the preselected numbers being dialled.

System and functions
The system shall operate by telephone an electro-mechanical lock at the building entrance.
The installation shall be integrated with the access control installation as well as any automatic doors.

Postal service requirements for entry via the entrance door must be considered.

Registers

Register shall be digitally integrated into the entrance intercom.

64.EBHB Lift intercom system

Lifts are equipped with an emergency telephone connected to the alarm centre via GSM transmitters.

64.ECC/2 Imaging System – cable TV systems

The TV system is included in the Triple Play package. The system is then included in 64.BCD/1 with an additional jack at each socket.

64.M Common power supply system for telecommunication system

64.MB Direct current power supply system

A DC power pack and batteries are installed as the power supply for telephonic installations.

Scope

The equipment is installed on a rack. The installation mainly consists of:

- Main fuse
- Circuit breaker
- Fuse panels
- Constant voltage regulated charging rectifier with accumulator battery
- Electric supply mains

System and functions

The power supply system shall be executed with rectifiers for direct drive (PSU).

The operating voltage of the system shall be 24 V DC. The power supply system with the requisite power is mounted on a mounting rack. The unit shall provide stabilised voltage and be permanently connected.

The installation must be 2-pin fused with a diazed fuse as the main fuse and fine-wire fuse as circuit breakers.

Outgoing circuits are to be fused 2-pin with fine-wire fuses.

64.Q TELEPHONIC CONTROL SYSTEM

64QDB System for opening smoke vents, etc.

Smoke vents in the lift shaft (TR2) are to be controlled by smoke detectors. Smoke vents in stairwells shall be controlled by a pushbutton at the entrance. An open vent indicator is mounted by the pushbutton at the entrance. The system must have a separate power supply with battery backup.
Alarm for "open smoke vent" from the limit switch is transferred to CCU via 01-network.
Scope: see the fire protection specifications designed for the project.

64.QD START SYSTEM FOR INDUCED DRAUGHT FANS

See the fire protection specifications designed for the project.

64.QE STOP SYSTEM FOR FANS IN EVENT OF FIRE

See the fire protection specifications designed for the project.

64.QF CLOSING SYSTEM FOR FIRE DOORS

System and functions
It must be possible to close fire doors individually with the pushbutton by the door.

WHB.32 **AUTOMATIC DOOR OPENING**

For doors with door closers or those that are heavy and used by the general public. See also Appendix 2 (access control system)

- **Automatic Doorway installed**.
- Electrical socket installed adjacent to the door opener.
- Ducting for doors equipped with electric striking plates.
- Ducting and installation of elbow switches.
- Integrated with access system and open buttons.

66 SYSTEM FOR EQUIPOTENTIAL BONDING AND ELECTRICAL SEPARATION

Earthing system
For earthing and equipotential bonding of telecommunications equipment, see SS-EN 50 310.
Observe the instructions in SEK handbok [manual] 413 utgåva 4 [4th edition]

66.DB LEAD-IN SHIELDS

Surge protectors must be installed in the main service panel.

66.G SYSTEM FOR EQUIPOTENTIAL BONDING

Equipotential bonding system

In addition to that which is stated in SS 436 40 00, point 413.1.2, the connection lead to the surge protector for telephonic systems must be connected to the main earth bar.
All incoming lines, pipes, etc. must be connected to the main earth bar.
Ventilation ducts are connected to the earth bar.

Observe requirements for any additional equipotential bonding of bathrooms/shower rooms.

66.HB SYSTEM FOR LIMITING ELECTRICAL FIELDS

System for limiting electric fields shall be executed as follows:
Twisted wires in tubes shall be used

Y LABELLING, TESTING, DOCUMENTATION, ETC.

YT LABELLING, CONTROL CHECKS, ADJUSTING, ETC. OF INSTALLATIONS

YTB LABELLING AND MARKING INSTALLATIONS

Labelling of electrical and telecommunications installations is carried out according to applicable high voltage regulations, Swedish Standards, and the applicable provisions for other systems.
The labelling shall be clear and unambiguous

YTB.1 Labelling of installations

The contractor shall produce a list of all signage/labels included in the contract with information on the texts, locations, and sizes. The list is submitted to the client for remarks/approval prior to production

Labels are to have black text on white background.

YTB.263 Signage for electric power installations

In addition to the AMA's text:
Lighting
For lighting systems designed for RF power, a warning notice shall be put up at the fuse box with the text ”ELEKTRONIK- KOMPONENT SOM KAN SKADAS VID ISOLATIONSMÄTNING SKALL KOPPLAS BORT FÖRE MÄTNING OCH PROV” [ELECTRONIC COMPONENTS THAT CAN BE DAMAGED BY ISOLATION MEASUREMENT MUST BE DISCONNECTED PRIOR TO MEASURING AND TESTING]

Signage at residual current devices
Signs are to be put up at residual current devices, with instructions concerning the need for regular performance testing, how to locate faults, and how to reconnect loads not affected by the fault.

Block diagram at terminal equipment
Mains diagram shall also be put up adjacent to the switchboard.

YTB.264 Signage for telecom installations

Network diagrams of all installations shall be mounted in electrical rooms / telecommunications rooms.

YTC CONTROL CHECKS AND ADJUSTING OF BUILDING SYSTEMS

YTC.1 Control Checks of building systems

In addition to the AMA's text:
Coordinated performance testing must be performed on all features and function relationships; see Chapters 5, 7, and 8.

YTC.16 Control checks of electrical and telecommunications system

In addition to the AMA's text:
During construction, the electrical installations must be inspected on an on-going basis to ensure that they meet the requirements of both the high voltage regulations as well as those of the client.
The contractor shall also carry out visual inspections of executed electrical installations and by testing prior to commissioning. The control checks apply to both electrical safety and such features that could affect safety. It must be verified. Documentation in the form of schematics, diagrams, or tables must be available at the control check.

Visual inspection

Visual inspections shall be on-going during execution of the installation. In order to systematize the control check measures, the contractor must prepare an action list. The visual inspection shall include control checks of the following, where applicable:

– Method of protection against electric shock, including the measurement of distances
– That measures have been taken against the spread of fire and thermal effects
– That cables wires have the correct cross-sectional area of a conductors with respect to the current-carrying capacity and the permitted voltage drop
– That protective equipment and monitoring devices are suitable and set correctly
– That isolators and coupling devices are suitable and correctly positioned
– That equipment and protection methods are selected with consideration to external influences
– That neutral conductors, grounding conductors, and PEN conductors have the correct colour combinations
– That there are drawings and warning signs or similar information
– That components such as circuits, fuses, switches, sockets and terminal blocks can be identified
– That conductors are properly connected
– That there is room for comfortable operation and maintenance of the electrical system.

Testing

In order to systematize the testing, the contractor must prepare an action list.

YTC.163

Control checks of the electrical power system

In addition to the specifications of AMA and ELSÄK-FS, the contractor must perform the following tests and measurements:

- Isolation measurement of mains and final circuits
- Control check of protective ground (the test method must be indicated).
- Performance test and measurement of RCD's conventional trip current.

All test results must be reported on typewritten forms and signed by the person who performed the test.

YTC.164

Control check of telecommunications systems

In addition to the AMA's text:
The following measurements and tests shall also be performed:

- Test and measurement of fire alarm system / evacuation alarm
- Test and measurement of key cards and entrance intercom system.
- Test and measurement of the multifunction network (01-network)
- Test and measurement of the multifunction network for telecommunications.
- Gauging all copper wires' transfer characteristic, impedance, and crosstalk between pairs.
- Test and measurement of AMR system
- Performance test of all system components. For each system component, protocol is prepared for all functions and function relationships.

Measurements shall be made in accordance with the requirements for link class E of SS-EN 50173-1 and submitted digitally and as a paper copy.

Documents which demonstrate that the AMR system is operational and approved by the supplier, as well as lists of all the meter points that are operational and tested, shall be submitted to the client upon final inspection. A safety management system plan for the selected brand must be attached to the document. Commissioning shall begin no later than three weeks prior to final inspection. Where residents move in phases, commissioning should also take place in phases. It is important that the communication connection is active via a broadband provider for the internet at the start of commissioning.

All test results must be reported on typewritten forms/protocol and signed by the person who performed the test.

YTC.1642

Control checks of telephonic safety systems

In addition to the AMA's text:
Testing of fire alarm systems shall be performed and documented. See also 64.CBB

YU TECHNICAL DOCUMENTATION, ETC. FOR INSTALLATIONS

In addition to the AMA's text:
Documents shall, unless otherwise indicated, be presented according to Construction documents 90 and BSAB 96.

Documents must be dated and bear the signature of the person responsible for the contents.

The thickness of lines and the font size must be such that micrography produces legible copies.

Documents shall be made digitally. See B3.4 CAD instructions

YUC CONSTRUCTION DOCUMENTS FOR INSTALLATIONS

Construction documents shall be delivered to the client in two instalments, unless otherwise indicated.

Drawings must be accompanied by a drawing list.

Regarding documents for review and review procedure, see AFD.242

YUC.6 Construction documents for electrical and telecommunications installations

YUC.63 Construction documents for electric power installations

In addition to the AMA's text: Drawings shall follow Construction Documents 90 and be drawn with CAD technology.

The contractor must provide the following documents:

- Drawings for cable trenches etc.; scale 1:200 - 1:500.
  Cable trenches for electrical wiring shall be coordinated with cable trenches for culverts, HVAC, and water mains and sewer pipes.
- Cross section through cable trenches in sections where space for laying cable is limited.
- Drawings of cable troughs and conduits in the sole plate for incoming lines and instructions for the installation of embedment items and pouring of foundations
- A site plan at a scale of 1:200 - 1:500 of Elverket and Televerket cables as well as all cables associated with the property.
- Riser schematic (mains diagram).
- Network diagram for entrance and access control systems with block diagram and list of facility components.
- Network diagram for entrance intercom system with block diagram and list of facility components.
- Network diagram for multifunction network (so-called 01-network) with block diagram and list of facility components.
- Network diagram for multifunction network for telecommunications with block diagram and list of facility components.

- Network diagram for AMR system with block diagram and list of facility components.
- Network diagram for opening smoke vents with block diagram and list of facility components.
- Plans in 1:50 scale. If separate type drawings of residences are made, the general assembly drawings of mains, telephone lines, etc. are to be scaled at 1:100. This also applies to electrical installations in HVAC and control and monitoring systems.
- Required single line diagram of boards and circuit diagrams, external connection schematic, or tables of automation within cabinets.
- Installation drawings for boards, cabinets, racks, and control panels.
- Sectional drawings for narrow passages
- Electrical description as per AMA.

YUC.64

Construction documents for telecommunications installations

See YUC.63.

YUD

AS-BUILT DOCUMENTS FOR INSTALLATIONS

In addition to the AMA's text: See YUC.63

As-built documents must be originals and must bear the text AS-BUILT DOCUMENT and the date.

The contractor must prepare as-built documents to the same extent as building permits, build notification, and construction documents. Refers to cases in which the contractor prepares the documents

The documents shall be coordinated with those of the other contractors. The turn-key contractor is responsible for coordination and no later than two weeks before the final inspection must submit to the client as-built documentation as per the following:

1. Three sets of paper copies in A4 binders with larger drawings reduced and copied to A3 size and folded to A4 size. Each binder shall have a label on the spine, a table of contents, and tabs with titles corresponding to the table of contents.

2. One set of drawings in the form of black and white paper copies at full scale.

3. Three sets of documents in digital format on CDs of non-ageing material ("gold record").
   Documents drawn up in CAD and saved in DWG and PDF formats.
   Other documents are saved as PDFs.

All digital as-built documentation, operating instructions, and maintenance manuals shall be of the same type, language, computer program, and version.

YUD.6

As-built documents for electrical and telecommunications installations

YUD.64

As-built documents for telecommunications installations

In addition to those specified under code YUD.6, the following documents shall be provided by the contractor.

– Installation drawings for the rack
– Overview plan and section list for fire alarm installation
– Registration documents for internal telecommunications networks according to SS 455 12 00

YUH

OPERATING INSTRUCTIONS FOR INSTALLATIONS

The drawing up of operating instructions and energy declarations shall be coordinated with other documents under YUD.

The turn-key contractor is responsible for coordination and no later than two weeks prior to the first move-in must submit to the client operating instructions and energy declarations as per the following:

- Three sets of paper copies – concerning the entire property – in A4 binders with larger drawings reduced and copied to A3 size and folded to A4 size. Each binder shall have a label on the spine, a table of contents, and tabs with titles corresponding to the table of contents.
- Three sets of documents in digital format on CDs of non-ageing material ("gold record").
- Documents drawn up in CAD and saved in DWG and PDF formats. Other documents are saved as PDFs.
- One set for each flat on things that concern the flat.

If this is not done, the client reserves the right to draw up instructions at the contractor's expense.

The following is presented for the property, premises, and other spaces:

- General overview description
- Description of equipment, mode of operation, supplemented with necessary drawings, schematic, and assembly and operating instructions.
- Fixture list with brand, light sources, and protection form.
- Descriptions, data sheets, and brochures of delivered equipment.
- Group lists
- List of equipment that contains batteries.
  The list is to contain the quantities of units, installation year, and replacement/scrapping schematic.
- Connection schematics or tables if equivalent information is not given in other documents.
- Protocol of tests and adjustments.

Presented for flats:

- Fixtures
- Type of light source and power
- Technical equipment
- RCD instruction
- Group list

YUH.6

Operating instructions for electrical and telecommunications installations

Coordinated operating instructions must be drawn up according to HSB's ”Mall för drift- och underhållsinstruktioner flerbostadshus” [Template for operation and maintenance instructions – block of flats] dated 01/05/2009.

YUK MAINTENANCE INSTRUCTIONS FOR INSTALLATIONS

The drawing up of maintenance instructions shall be coordinated with other documents under YUD.

The turn-key contractor is responsible for coordination and no later than two weeks prior to the first move-in must submit to the client maintenance instructions as per the following:

– Three sets of paper copies – concerning the entire property – in A4 binders with larger drawings reduced and copied to A3 size and folded to A4 size. Each binder shall be have a label on the spine, a table of contents, and tabs with titles corresponding to the table of contents.

– Three sets of documents in digital format on CDs of non-ageing material ("gold record").
Documents drawn up in CAD and saved in DWG and PDF formats.
Other documents are saved as PDFs.

– One set for each flat on things that concern the flat.

If this is not done, the client reserves the right to draw up instructions at the contractor's expense.

See YUH for contents.

YUM ENVIRONMENTAL DOCUMENTATION FOR INSTALLATIONS

YUM.1 Declaration of environmental impact of goods and materials in installations

The contractor shall submit a building product declaration (BPD) drawn up in accordance with Byggsektorns Kretslopps anvisningar 2007 [the Building Sector Ecocycle guidelines 2007] for the goods and materials included in the contract.

The data must be quantifiable and include lifecycle chain "Raw material extraction and production" as well as present
– total energy usage, types of energy, and distribution
– Airborne emissions of greenhouse gases, dust, sulphur dioxide, and nitrogen dioxide.
– Ground emissions (hazardous waste, combustible waste, non-combustible waste)

YUM.11 Declaration of exterior environmental impact of goods and materials in installations

The document is drawn up in accordance with Byggsektorns Kretsloppsråd's publication ”Byggvarudeklarationer” [Building product declarations].

YUM.12

Declaration of internal environmental impact of goods and materials in installations

The document is drawn up in accordance with Byggsektorns Kretsloppsråd's publication ”Byggvarudeklarationer” [Building product declarations].

YUP

INFORMATION FOR OPERATIONS AND MAINTENANCE PERSONNEL

YUP.6

Electricity and telecommunication installations information for operation and maintenance personnel

In addition to the AMA's text:
The information for personnel shall be drawn up on the basis of operating instructions prepared for the installation and shall consist of two main parts:

- Theoretical review upon contract completion but prior to final inspection.
- On-site review on two occasions; upon completion of the contract but prior to final inspection, and upon the expiration of the guarantee period.

Total time required is estimated to be 2 days.

YUQ

VERIFICATION PLANS FOR INSTALLATIONS

YUQ.6

Verification plans for electrical and telecommunications installations

Verification plans for design work
The contractor's safety management system shall be coordinated with all other contractors, suppliers to the project, and requirements of authorities.

Verification plans for the environment
Verification plans shall cover the identification and sorting of materials that pose a health or environmental hazard as waste.

Verification plans for construction
The contractor's safety management system shall be included in the contract commitment in its entirety to ensure functionality of the delivery

Verification plans shall also include the provisions under YTC.16, "Testing of electrical and telecommunications systems" and YTC.26 "Adjusting of electrical and telecommunications systems." See also AFD.32, etc.