

CRR-G-033-D Guideline for Application for Acceptance of New Light Rail Works **Annex 1**

Parameter No.	Parameter		
1.00	General Information on project scope		
1.01	Summary of General Arrangement and Type and Purpose of Project (e.g. Line, kilometre points/ section, project boundary, location/ class/ type/length of: track, switches, crossings, max speed, train frequency, stops, platforms, structures, type of RST, RST-depots, freight hubs, permitted paths, stabling tracks, etc.)		
1.02	Declaration of intended design life for each aspect of the project		
1.03	Absence and/or control of hazardous materials during installation, operation, maintenance, de-commissioning. At min. declaration on absence of Asbestos, PCB, radioactive material (e.g. inside ionising smoke detectors), mercury.		
1.04	Resistance to environmental factors (e.g. ranges for temperature, moisture, snow level, water level, etc.)		
1.05	Fixed aspect track side: non CCT boards / foul point markers (retroreflective properties, design, size, etc.)		
1.06	Mechanical enclosure, tamper / vandalism protection / Road vehicle containment (for powered systems, track, tunnels, control facilities, local interlockings, etc.)		
1.07	Locking arrangement, access control, intrusion detection to safety related equipment, appropriate tamper protection for all parameters (including mechanical enclosure, locking arrangements, access management, intrusion detection, CCTV, etc.)		
1.08	Overall Works fire safety concept and concept of evacuation (e.g. Emergency Plan, performance evaluation, fire barriers, emergency equipment (fire extinguishers, first aid equipment, etc.), integration of the individual concepts for the various parameters (Light Rail Rolling Stock concepts, tunnel/ underground structures concept, powered system concepts, station concepts, etc.))		

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2.00	Light rail Integration		
2.01	Provisions for line of sight driving (sight lines (landscaping), separation from other traffic, etc.)		
2.02	Transition between segregated and shared alignment		
2.03	Shared running / intersections with other traffic (e.g. pedestrians, pedestrian zones, cyclists, road, light-rail, rail, protection equipment/arrangements, signage)		
2.04	Level crossings (e.g. layout, signage, signalling)		
2.05	Management of frontages and access / crossing requirements		
2.06	Management of public utilities (including ducts, chambers, cabinets, etc.)		
2.07	Emergency access / egress, evacuation concept for alignment		
2.08	Access control to light rail alignment or equipment		
2.09	Boundary works		
2.10	Lighting of alignment		
3.00	Light-Rail Clearance (all values to include nominal values and maintenance tolerances)		
3.01	Determination on gauging concept (kinematic / dynamic), associated gauges and calculation rules		
3.02	Electrical clearance concept (pantograph, shoe-gear, etc.)		
3.03	Enlarged clearance between light-rail and structures, landscape, other traffic, etc.		
3.04	Clearances on shared running (road, light-rail, heavy-rail)		
3.05	Clearances for maintenance walkways, access roads parallel to the track		

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4.00	Track Alignment (all values to include nominal values and maintenance tolerances)		
4.01	Determination of track alignment concept (including: maximum gradients, minimum radii of horizontal and vertical curves, geometric limits of reverse curves, maximum speeds in combination with permitted cant deficiencies, maximum cant, check rails, guard rails, grooved rail, flange running, unguided length of fixed obtuse crossings, etc.)		
	--> must be evaluated in conjunction with parameters on Clearance and Guidance Function		
4.02	Fixed and variable signage (distance markers, foul point markers, line speed, turnout routing, end of line, etc.)		
5.00	Track		
5.01	Axle load, Meter Load		
5.02	Rail head profile, Rail inclination		
5.03	Rail hardness		
5.04	Rail fastening systems (static longitudinal loads, dynamic loads, application and repair-concepts)		
5.05	Track sleepers (geometry, resistance to applied loads, permitted combinations with rail, rail inclination, rail fastening systems, permitted axle loads, permitted bending moments)		
5.06	Slab track systems (geometry, resistance to applied loads, permitted combinations with rail, rail inclination, rail fastening systems, permitted axle loads, permitted bending moments)		
5.07	Nominal track gauge and tolerances (including turnouts, grooved rails, checkrails, guard rails)		
5.08	Nominal cross level and tolerances (cant, Rate of change of cant, permitted cant deficiency (plain track, switches, crossings, abrupt change of cant deficiency in switches, etc.)		

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5.09	Equivalent conicity - design limits		
	(for speeds above 60km/h)		
5.10	Drainage		
5.11	Derailment containment or alternatives (Adequate derailment containment on all bridges and structures and elsewhere where the consequences of derailment would result in a significant hazard)		
6.00	Switches, crossings, expansion devices, derailment devices (all values to include nominal values and tolerances)		
6.01	Switches and crossings: Location, layout, geometry of switches and crossings (avoidance in tunnels / on bridges / in areas with public access)		
6.02	Derailment devices (derailers): Location, layout, geometry (prohibition on bridges, embankments, avoidance in tunnels), free space as required		
6.03	Switches and crossings and Derailment devices (derailers): Means of switching and locking after switching		
6.04	Expansion devices: Location, layout, geometry		
7.00	Structures		
7.01	General parameter for any new or modified structures:		
	Vertical loading for earthworks and earth pressure effects		
7.02	General parameter for any new or modified structures:		
	Fire safety and evacuation for any structures (fire protection of powered systems, emergency access and egress, emergency water supply, emergency communication between control and local staff, etc.)		
7.03	General parameter for any new or modified structures:		
	Noise and vibration suppression		

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7.04	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Resistance of sub structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, etc.)		
7.05	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Resistance of super structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, etc.)		
7.06	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Parapet containment		
7.07	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Nominal parapet height + OCS protection		
7.08	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Safety barriers on approach and exit		
7.09	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Resistance of supports to rail vehicle impact		
7.10	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Provisions for maintenance		
7.11	New bridges/viaducts over the railway or other new structures over or adjacent to track:		
	Drainage		

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7.12	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Resistance of sub structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.)		
7.13	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Resistance of super structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.)		
7.14	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Parapet containment		
7.15	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Nominal parapet height + OCS protection		
7.16	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Safety barriers on approach and exit		
7.17	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Resistance of supports to rail vehicle impact (supports must be so dimensioned that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure must be able to support the loads imposed on it)		
7.18	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Provisions for maintenance		

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7.19	Modification of existing bridges/viaducts or other structures over or adjacent to the track:		
	Drainage		
7.20	New bridges/viaducts or other structures under the railway:		
	Resistance of sub structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.) (Endangered supports should be dimensioned so that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure should be able to support the loads imposed on it.)		
7.21	New bridges/viaducts or other structures under the railway:		
	Resistance of super structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.) (Endangered supports should be dimensioned so that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure should be able to support the loads imposed on it.)		
7.22	New bridges/viaducts or other structures under the railway:		
	Resistance of structures, sub/super to fixtures (e.g. OCS support, signals, inspection walkway)		
7.23	New bridges/viaducts or other structures under the railway:		
	Derailment containment		
7.24	New bridges/viaducts or other structures under the railway:		
	Provision of walkway/handrails/access		

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7.25	New bridges/viaducts or other structures under the railway:		
	Head room for public road bridges		
7.26	New bridges/viaducts or other structures under the railway:		
	Provisions for maintenance		
7.27	New bridges/viaducts or other structures under the railway:		
	Drainage		
7.28	Modification of existing bridges/viaducts or other structures under the railway:		
	Resistance of sub structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.) (Endangered supports should be dimensioned so that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure should be able to support the loads imposed on it.)		
7.29	Modification of existing bridges/viaducts or other structures under the railway:		
	Resistance of super structure to relevant loads (vertical, nosing, traction/braking forces, resulting track twist, derailment containment, etc.) (Endangered supports should be dimensioned so that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure should be able to support the loads imposed on it.)		
7.30	Modification of existing bridges/viaducts or other structures under the railway:		
	Resistance of structures, sub/super to fixtures (e.g. OCS support, signals, inspection walkway)		

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7.31	Modification of existing bridges/viaducts or other structures under the railway:		
	Derailment containment		
7.32	Modification of existing bridges/viaducts or other structures under the railway:		
	Provision of walkway/handrails/access		
7.33	Modification of existing bridges/viaducts or other structures under the railway:		
	Head room for public road bridges		
7.34	Modification of existing bridges/viaducts or other structures under the railway:		
	Provisions for maintenance		
7.35	Modification of existing bridges/viaducts or other structures under the railway:		
	Drainage		
7.36	Embankments/Cuttings:		
	Resistance to vertical loading and earth pressure effects or other applied loads		
7.37	Embankments/Cuttings:		
	Drainage		
7.38	Embankments/Cuttings:		
	Protection of track from falling material, road vehicles etc.		
7.39	Embankments/Cuttings:		
	Provisions for maintenance		

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7.40	Retaining Walls:		
	Resistance to vertical loading and earth pressure effects or other applied loads		
7.41	Retaining Walls:		
	Parapet/handrail details/vehicle containment/protection of track from falling material, road vehicles etc.		
7.42	Retaining Walls:		
	Provisions for maintenance		
7.43	Retaining Walls:		
	Drainage		
8.00	Tunnels and Underground structures (including lines, stations, stabling, etc.)		
8.01	Resistance of structures to relevant loads (vertical, buoyancy, traction/braking forces, resulting track twist, derailment containment, pressure variations, etc.)		
	(Endangered supports should be dimensioned so that they remain stable in the event of a vehicle colliding with them, otherwise should a support be destroyed, the rest of the structure should be able to support the loads imposed on it.)		
8.02	Resistance of structure to exceptional loads (tunnel fire, flooding, etc.)		
8.03	Water proofing, Drainage		
8.04	Walkways for operation, evacuation or maintenance (additional clearances, handholds...)		
8.05	Ventilation, prevention of unacceptable piston effects		

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8.06	Fire safety and evacuation concept for tunnels and underground structures (fire performance test reports on combustible material (including e.g. electrical equipment), fire protection of fitted powered systems, cross-links between parallel tunnels, emergency access and egress, emergency power supply, emergency water supply, emergency communication between control and persons in tunnel/underground structure, ventilation management, smoke extraction, fire detection/ suppression systems, etc.)		
8.07	Floodgates, fire separations, interfaces to signalling systems		
8.08	Provisions for maintenance		
9.00	Stations, Stops		
9.01	General arrangement (location, dimensions, access/egress concept, planning criteria, passenger capacity, design-concepts, provisions for PRM, etc.)		
9.02	Lighting (platforms, other areas)		
9.03	Access and egress (doors, tactile guidance concept, normal and emergency)		
9.04	Parking facilities for PRM		
9.05	Toilet facilities		
9.06	Transparent obstacles (windows, doors, etc.)		
9.07	Furniture and free-standing devices		
9.08	Ticketing, Ticket Control and Customer Assistance Points		
9.09	Signage/Information: Visual information, Tactile Information, Audible information, Spoken Information, Passenger Information System (PIS)		

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9.10	Fire safety and evacuation concept for stations/stops (fire performance test reports on combustible material (including e.g. electrical equipment), fire protection of fitted powered systems, emergency access and egress, emergency power supply, emergency water supply, emergency communication between control and persons in stations/stops, ventilation management, smoke extraction, fire detection / alarm / suppression systems, etc.)		
9.11	Escalators, lifts, travellers		
9.12	Pedestrian Footways & Crossings		
9.13	Fencing / Guidance of Passengers		
9.14	Steps, ramps, landings and handrails		
9.15	Drainage		
9.16	Provisions for maintenance		
10.00	Platforms		
10.01	General guidance		
	(including platform surface, edge identification, end identification and length of platform)		
10.02	Platform height, width, clearances		
10.03	Overhead clearances at platforms		
10.04	Steps, ramps, landings and handrails		
10.05	Drainage		
10.06	Provisions for maintenance		

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11.00	Platform Screen Doors		
11.01	General concept (door height, width, etc.)		
11.02	Structural design (pressure effects, passenger crowding, abuse, etc.)		
11.03	Emergency access / egress, evacuation concept (also in case of misaligned vehicles, etc.)		
11.04	Protection of passengers from moving parts / obstacle detection		
11.05	Provisions for maintenance		
12.00	Powered Systems (systems which use, generate, store, distribute power)		
12.01	Electrical equipment other than traction (protection against electric shock, isolation devices, MCB ratings, mechanical and electrical protection (e.g. surge/lightning protection, overload protection), storage devices, etc.)		
12.02	Electrical Batteries/Capacitors other than traction (protection against electric shock, load shedding to support emergency power, battery box ventilation, protection, isolation devices, voltage ranges in reception or re-generation, lightning protection, etc.)		
12.03	Electric traction power equipment (protection against electric shock, national grid feed, transformers, rectifiers, substations, feeders, isolation devices, equipment design, mechanical and electrical protection (e.g. overload protection), electrical interface, switching and control, regenerative braking interface, return path, voltage ranges in reception or re-generation, surge/lightning protection, etc.)		
12.04	Electric Traction Power Batteries / Capacitors (protection against electric shock, isolation devices, ventilation, mechanical and electrical protection (e.g. surge protection, overload protection), isolation devices, emergency discharge, etc.)		
12.05	Earthing / electrical bonding / return current		

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12.06	EMC & harmonics: Overall concept including any electric powered system, compatibility with operating environment, signalling system, other railways, incl. special locations / fault conditions		
12.07	Pneumatic systems (isolation devices, air supply, protection, filtering, etc.)		
12.08	Hydraulic systems (isolation devices, ventilation, protection, filtering, etc.)		
12.09	Thermomechanical combustion engines, fuel system, power train (isolation devices, ventilation, protection, filtering, etc.)		
12.10	Other powered systems (isolation devices, ventilation, protection, filtering, etc.)		
12.11	Fire Safety of Powered Systems (material properties, test reports, fire detection, fire suppression, fire compartments, etc.)		
13.00	Traction Power Supply Conductor, Current Return (Overhead Contact Line, Third Rail, Charge Points, etc.)		
13.01	Nominal values and permitted limits of speed, current, voltage, frequency, power factor at the terminals of a substation and at any pantograph contact point supplied from that substation		
13.02	Electrical protection coordination (incl. performance of automatic circuit breakers (immediate limits for over/under voltage, max. instantaneous voltage change over time, thermal limits, immediate limits for over current, max. instantaneous current change over time, lightning surge arrestors, protection of autotransformer systems, shielding under / over-bridges, etc.)		
13.03	Concept for shared operation (e.g. on road, on heavy rail (tram-train))		
13.04	Harmonic emissions towards the national grid		
13.05	Max. permitted power draw per single pantograph in standstill or in movement		
13.06	Stray current protection to railway equipment and any other equipment (e.g. utilities)		

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13.07	Segmentation of conductor, switching of segments, earthing of segments (in general applications, in tunnels, in stations, etc.)		
13.08	Electrical protection, bonding of adjacent conducting structures (protection against dislocated live conductors, etc.)		
13.09	Auxiliary supplied from Traction Conductor (e.g. turnout heating)		
13.10	Mechanical mounting, mast systems of conductor (including specific solutions for mounting on bridges / embankments / in stations, nominal height (min. /max.), permitted tolerances (design min., absolute min., design max., absolute max.) (considering sag, creep, ice loading, uplift, etc.))		
	For OCL: Max. permitted lateral deviation from centre line of track (under cross wind, curves, track tolerances, pantograph movement, etc.)		
13.11	Dynamic behaviour of conductor and quality of current collection		
13.12	OCL: Pantograph spacing (min. spacing between adjacent raised pantograph.)		
	Max. no of permitted pantographs per Light Rail Rolling Stock		
13.13	Conductor material, cross-section, permitted vehicle contact strip/shoe material (AC/DC)		
13.14	Feeder lines, return current lines, long distance feeders parallel to the railway, material, cross-section, mounting, mast systems, etc.		
13.15	Electric protection concept of crossings with other railways, national grid, telecoms, etc.		
13.16	Electric protection concept of road crossings (signage, goal frames, etc.)		
13.17	Phase/system separations: Geometry and general design concept of system separation sections, local and remote control / status detection interface, switchgear of system separation sections (e.g. to allow re-start of train in isolated sections)		
13.18	Provisions for maintenance		

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14.00	Fixed installations Control & Monitoring Equipment		
	(only functions which relate to the internal management of fixed installations, not CCT)		
14.01	General concept of systems and functions (electrics, electronics, software and/or hardware, SCADA, etc.); Including remote control of powered systems		
14.02	Safety-related functions of control and monitoring equipment: Detailed design, safety evaluation (e.g. PSD management, management of powered systems, supervision of substations, management of fire alarm and fire suppression, etc.)		
14.03	Voice communication systems for staff (cable/ radio) between line side phones, signalling controls, CTC, emergency communication		
14.04	Voice communication systems for passengers to control (cable/ radio) between line side or station emergency communication points (including e.g. lifts), train emergency communication points, CTC		
14.05	Safety-related functions of train control and monitoring systems for degraded operation		
14.06	Interfaces of Safety-related functions of control and monitoring systems to CCT systems (e.g. PSD management, etc.)		
14.07	Protection of power supply to safety-related train control functions; Load shedding, individual MCBs, etc.		
14.08	Remote control of fixed installation control and monitoring equipment		
14.09	PSD operation (normal, emergency, protection of users, locking in closed)		
14.10	CCTV systems (Platforms, PSDs, alignment, stations, stops, help-points, access control points, etc.)		
14.11	Central control facilities (location, layout, safety related functions, human factors, back-up control facilities, etc.)		
14.12	Emergency Help Points		

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14.13	Data recording for Control and Monitoring Equipment		
14.14	Provisions for maintenance		
15.00	Fixed installations Train Command / Control / Signalling Equipment (CCT)		
	(only CCT functions, not functions which relate to internal management of fixed installations)		
15.01	General concept of CCT operations and functions: Normal and degraded operational modes and concepts (layout, line speeds, gradients, points, crossings, normal, reverse direction, permitted degraded modes, remote operations, operating mode transitions, etc.)		
15.02	Safety-related functions of CCT systems; Detailed design, safety evaluation of CCT systems (electrics, electronics, software and/or hardware) (e.g. Automatic Train Protection (ATP), Automatic Train Operation (ATO), automated management of powered systems, remote control, detection of obstacles on track, selective door opening, platform side detection, positioning at platform, interaction with platform screen doors, etc.)		
15.03	Safety-related functions of CCT systems for degraded operation (e.g. failure of ATO, operation with declared fire on-board, etc.)		
15.04	Interfaces of Safety-related functions of CCT systems to Works (selective door opening, platform side detection, positioning at platform, interaction with platform scene doors, obstacle detection, etc.)		
15.05	Protection of power supply to safety related CCT; Load shedding, individual MCBs, etc.		
15.06	Data recording concept, Data Logger/event recorder		
15.07	Line side signals, boards, etc.		
15.08	CCT Control Room(s): general concept, equipment, etc.		

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15.09	CCT Control Room(s) Interface spec. (functional/physical/logical) of CCT equipment to: interlocking, data transmission, power supplies, local and remote control and display systems, other equipment		
15.10	Local areas CCT data communication links		
15.11	Long range CCT data communication links		
15.12	Interlocking, road traffic controller: Table of permitted routes/paths, block margins/overlaps, wrongside working, speed limits, interlocking type and requirements and permitted normal/permitted degraded operational conditions (e.g. normal operations, shunting), Specific Interlocking Application Data, control table requirements, road traffic controller requirements.		
15.13	Interlocking, road traffic controller: Interface specification (functional/physical/logical): operator interface, remote control, data transmission, power supplies, control and display systems, other interlocking systems, trackside signalling equipment, other equipment, etc.		
15.14	Interlocking: Signalling controls type/locations: interlocking facilities, road traffic controllers, crossing controllers, etc.		
15.15	Train ID management and routing system: permitted normal and degraded operational modes, interface spec. (functional/physical/logical): to data generation, interlocking, data transmission, power supplies, local and remote control & display systems, other equipment		
15.16	Train detection systems: detection loops, axle counters, etc. (including impedance bonding, feed lines, etc.)		
15.17	Train detection systems: permitted normal and degraded operational modes (e.g. degraded operation concept, emergency & engineering controls)		
15.18	Train detection systems: Specific interface parameter to rolling stock (wheel to wheel continuity, axle load, minimum metal masses, sanding, magnetic track brakes, wheel impedance, metal free space around wheels, wheel geometry, vehicle geometry, position of first/ last /intermediate wheelsets in train, requirements on wheel diameters etc.)		

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15.19	ATP System: Specific parameter, type of signalling system, functions (e.g. signal protection, block protection, moving block, overspeed protection, air gap definition, etc.)		
15.20	ATP System: Permitted normal and degraded operational conditions (e.g. degraded operation concept, emergency and engineering controls)		
15.21	ATP System: Interface spec. (functional/physical/logical), e.g. to interlocking, braking rates, block length/ overlap, data transmission, power supplies, local control and display systems, other equipment		
15.22	Variable aspect track side signals, locations, permitted normal and degraded operational conditions (e.g. remotely controlled, local setting, route indicator, degraded operation concept, emergency and engineering controls)		
15.23	Variable aspect track side CCT signals: Interface spec. (functional/physical/logical): to interlocking, data transmission, power supplies, local control and display systems, other equipment		
15.24	Fixed aspect track side CCT signals (retroreflective properties, design, size, etc.)		
15.25	Point equipment (actuator, locking, detection, heater, etc.), permitted normal and degraded operational conditions (e.g. remotely controlled, local setting, emergency and engineering controls, point securing, position indication, degraded operation concept, emergency and engineering controls)		
15.26	Signalised Road and Pedestrian Crossings: type of crossing, location, geometry, layout, sightlines, equipment (road signals, track signals, traffic signs and road markings, track side boards, equipment housing, etc.), speed limits, interlocking/RT controller interface and permitted (normal) operational conditions (e.g. normal operations, permitted degraded operational conditions (e.g. degraded operation concept, emergency and engineering controls), CCTV surveillance, automatic working)		
15.27	Data recording for CCT		
15.28	Provisions for maintenance		

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16.00	Interface to Light Rail Rolling Stock		
16.01	Health, Safety and Environment:		
	Noise and vibration suppression		
16.02	Infrastructure Interface: Concept of compatibility with infrastructure and operations (general and specific operational restrictions, route restrictions)		
16.03	Infrastructure Interface: Track / alignment interface criteria (including: track gauge and track tolerances, maximum gradients, minimum radii of horizontal and vertical curves, geometric limits of reverse curves, max. speeds in combination with permitted cant deficiencies, max cant, check rails, guard rails, grooved rail, flange running, etc.)		
	(must be evaluated in conjunction with parameters on gauging concept and running dynamics)		
16.04	Infrastructure Interface: Free movement of bogies, gangways, etc. based on prescribed alignment criteria		
16.05	Infrastructure Interface: Determination on gauging concept (kinematic / dynamic), associated gauges and calculation rules		
16.06	Infrastructure Interface: Platform interface, mobility-impaired passenger needs, powered steps/bridging plates		
16.07	Coupling and drawgear Interface: Geometric position, gathering range on prescribed alignment criteria		
16.08	Coupling and drawgear Interface: Mechanical coupling interface (incl. inter-vehicle coupling of trainsets)		
16.09	Coupling and drawgear Interface: Electrical interface		
16.10	Traction power supply: OCS geometric interface		
16.11	Provisions for Vehicle rescue: Giving/receiving assistance, emergency coupling arrangements and limitations, compatibility with re-railing processes and equipment		

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17.00	Provisions for Maintenance		
17.01	Concept on scope, methods, intervals, maintenance records, tools, training.		
	For all safety critical equipment maintenance tolerances must be defined in co-ordination with the individual parameter maintenance provisions		
17.02	Traceability of safety critical equipment: Component identifiers (unique ID, type, version, origin, etc.)		
17.03	Software identifiers (unique ID, type, version, origin, etc.)		
18.00	Provisions during heavy maintenance/construction work		
18.01	Health and safety of staff at worksite including technical safeguards, protection of staff from aerodynamic effects, train movements		
18.02	Protection of passengers / members of the public / running rail traffic / other parties during execution of work		
18.03	Protection of environment		
18.04	Temporary Works Design (Structural evaluation of scaffolding or any non-permanent structural works or earthworks during construction)		
18.05	Specific operating rules update during planned work		
18.06	Roadworks		
18.07	Drainage		
18.08	Demolition of structures near a railway		
19.00	Provisions for operation		
19.01	Operating rules / specific training requirements for normal operations, degraded operations, emergency operations, training and emergency exercises (including tunnels if applicable), underground structures, ATP, ATO, etc.		

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19.02	Health and safety of staff at worksite including technical safeguards, protection of staff from aerodynamic effects, train movements		
20.00	Requirements for safety in railway tunnels **		
	<p>** The safety in railway tunnels TSI (EU) 1303/2014 is not mandated for Light Rail/Metrolink systems. However, the CRR see it as good industry practice and apply a similar approach to both Heavy Rail and Light Rail/Metrolink systems.</p> <p>Applicants may choose an alternative approach for requirements for safety in railway tunnels but applicants must demonstrate that this alternative approach will result in providing evidence that the topics listed in this section 20 are adequately captured and safety requirements fulfilled.</p>		
20.01	General - calculation of length of tunnel	When calculating the tunnel length in the context of evacuation and rescue the position of tunnel access points (from the portals) must be considered.	
20.02	Evacuation and Rescue	Identification of the relevant measures to mitigate the risks arising from a 'hot' tunnel specific railway incident ('hot' incidents: fire, explosion followed by fire, emission of toxic smoke or gases)	TSI SRT 2.2 (b) TSI SRT 2.2.1
20.03	Evacuation and Rescue	Identification of the relevant measures to mitigate the risks arising from a 'cold' tunnel specific railway incident ('cold' incidents: collision, derailment)	TSI SRT 2.2 (b) TSI SRT 2.2.2
20.04	Evacuation and Rescue	Identification of the relevant measures to mitigate the risks arising from a prolonged stop in the tunnel	TSI SRT 2.2 (b) TSI SRT 2.2.3
20.05	Evacuation and Rescue	Description of evacuation and rescue operations following hot tunnel specific railway incident	TSI SRT 2.2 (a) TSI SRT 2.2.1

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20.06	Evacuation and Rescue	Description of evacuation and rescue operations following cold tunnel specific railway incident	TSI SRT 2.2 (a) TSI SRT 2.2.2
20.07	Evacuation and Rescue	Description of evacuation and rescue operations following prolonged stop in the tunnel	TSI SRT 2.2 (a) TSI SRT 2.2.3
20.08	Emergency Response Services	Definition of role	Fire Services Act 1981 & 2003 TSI SRT 2.3 (a)
20.09	Emergency Response Services	A fire authority shall— (a) make provision for the prompt and efficient extinguishing of fires in buildings and other places of all kinds in its functional area and for the protection and rescue of persons and property from injury by fire, and (b) establish and maintain a fire brigade, provide premises and make such other provision as it considers necessary or desirable for such purpose, and (c) make adequate provision for the reception of and response to calls for the assistance of the fire brigade.	TSI SRT 2.3
20.10	Emergency Response Services	Major emergencies will be managed within the National Major Emergency Framework using an all hazards approach utilising existing resources.	TSI SRT 2.3 (e)
20.11	Emergency Response Services	Additional measures may be required by the emergency services	TSI SRT 2.3 (f)
20.12	Functional and technical specifications	Prevent unauthorised access to emergency exits and technical rooms	TSI SRT 4.2.1.1

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20.13	Functional and technical specifications	Fire resistance of tunnel structures	TSI SRT 4.2.1.2
20.14	Functional and technical specifications	Fire reaction of building material	TSI SRT 4.2.1.3 (EU) 2016/364
20.15	Functional and technical specifications	Fire detection in technical rooms (tunnels longer than 1km)	TSI SRT 4.2.1.4
20.16	Functional and technical specifications	Evacuation facilities - safe area (tunnels longer than 1km)	TSI SRT 4.2.1.5.1
20.17	Functional and technical specifications	Evacuation facilities - access to the safe area (tunnels longer than 1km)	TSI SRT 4.2.1.5.2
20.18	Functional and technical specifications	Evacuation facilities - communication means in safe areas (tunnels longer than 1km)	TSI SRT 4.2.1.5.3
20.19	Functional and technical specifications	Evacuation facilities - emergency lighting (tunnels longer than 500m)	TSI SRT 4.2.1.5.4
20.20	Functional and technical specifications	Evacuation facilities - escape signage (all tunnels)	TSI SRT 4.2.1.5.5
20.21	Functional and technical specifications	Escape walkways (tunnels longer than 500m)	TSI SRT 4.2.1.6
20.22	Functional and technical specifications	Evacuation and rescue points - calculation of length of tunnel	TSI SRT 4.2.1.7 (a)
20.23	Functional and technical specifications	Evacuation and rescue points - outside the tunnel or inside the tunnel	TSI SRT 4.2.1.7 (b)

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20.24	Functional and technical specifications	Evacuation and rescue points - all requirements (water, train position, accessible to emergency services, de-energisation)	TSI SRT 4.2.1.7 (c)
20.25	Functional and technical specifications	Evacuation and rescue points - requirements outside the portals of the tunnel	TSI SRT 4.2.1.7 (d)
20.26	Functional and technical specifications	Evacuation and rescue points - requirements inside the tunnel	TSI SRT 4.2.1.7 (e)
20.27	Functional and technical specifications	Emergency communication - radio communication between train and infrastructure manager control centre (tunnels longer than 1km)	TSI SRT 4.2.1.8 (a)
20.28	Functional and technical specifications	Emergency communication - radio continuity between emergency response services and on-site command facilities (tunnels longer than 1km)	TSI SRT 4.2.1.8 (b)
20.29	Functional and technical specifications	Electricity supply for emergency response services (tunnels longer than 1km)	TSI SRT 4.2.1.9
20.30	Functional and technical specifications	Reliability of electrical systems (tunnels longer than 1km)	TSI SRT 4.2.1.10
20.31	Functional and technical specifications	Communication and lighting at switching locations (tunnels longer than 1km)	TSI SRT 4.2.1.11
20.32	Emergency Rules	Operational rules must address monitoring of train condition before entering the tunnel and incident management inside and outside the tunnel	TSI SRT 4.4.1
20.33	Tunnel Emergency Plan	When considering the tunnel emergency plan 17.1 must be taken into account	TSI SRT 4.4.2

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20.34	Emergency Plan Exercises	When considering the tunnel emergency plan 17.1 must be taken into account	TSI SRT 4.4.3
20.35	Emergency Plan - details	Switching off and Eathing Procedures: information to emergency services	TSI SRT 4.4.4
20.36	Provision of information to passengers	Passengers shall be informed of on board emergency and safety procedures.	TSI SRT 4.4.5 (a) and (c)
20.37	Health and Safety	Self-rescue device - freight trains, driver and other persons on board	TSI SRT 4.7.0 TSI SRT Appendix A