APPENDIX I: HIGH-SPEED RAIL CORRIDOR CONSTRUCTION EQUIPMENT LIST BY CONSTRUCTION PHASE

Construction scenarios, including lists of equipment along with the assumed equipment numbers, noise emission levels (from FRA 2012 and FHWA 2006), usage factors, and daily hours of operation, are provided in Tables I-1 through I-9 below for each construction activity.

Table I-1 Scenario for At-Grade Rail Construction (First Street, City of Los Angeles, to ARTIC)

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Utility Relocation					
Trencher	85	2	5	7	74
Concrete transit mixer	80	5	4	4	70
Haul truck	84	2	15	4	76
Front end loader	80	3	15	7	76
Other construction equipment	85	3	40	7	85
Phase: New Track Ballast Installation					
Track, tie & ballast laying machine	85	1	5	6	71
Ballast tamper	83	1	10	6	72
Crawler tractor	84	1	10	6	73
BNSF rail train	85	2	0.5	6	64
Other construction equipment	85	4	15	6	82

ARTIC = Anaheim Regional Transportation Intermodal Center; dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-2 Scenario for Aerial and Tunnel Structure Direct Fixation Rail Installation

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Plinth Construction					
Concrete pumper	82	2	60	7	82
Concrete haul truck	84	6	60	7	89
Flatbed truck	84	2	60	6	84
Crane	85	2	60	4	83
Other construction equipment	85	10	60	7	92

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-3 Scenario for Trench Construction (Fullerton)

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Utility Relocation					
Trencher	80	1	25	7	73
Concrete transit mixer	85	2	35	4	80
Front end loader	80	1	50	6	77
Other construction equipment	85	3	25	6	86
Phase: Tunnel Construction					
Drill rig	85	2	25	7	81
Crane	85	2	68	7	86
Concrete pumper	82	3	35	7	82
Concrete transit mixer	85	3	25	7	83
Other material handling equipment	85	3	50	7	86
Crawler dozer	85	2	50	7	84
Off-road truck	84	6	40	7	87
Front end loader	80	6	50	7	84
Dozer	85	2	35	7	83
Grader	85	2	55	7	85
Roller	85	1	45	7	81
Forklift	75	1	65	5	71
Excavator	85	2	70	7	86
Other construction equipment	85	5	45	6	87

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-4 Scenario for Elevated Structure Construction (Commerce)

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Utility Relocation					
Concrete transit mixer	85	1	2	7	67
Haul truck	84	2	10	7	76
Front end loader	80	1	65	7	78
Trencher	80	1	20	7	72
Other material handling equipment	85	4	40	7	86

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Foundation and Column Construction					
Front end loader	80	4	56	7	83
Crane	85	9	40	7	90
Drill rig	85	4	70	6	88
Concrete pumper	82	6	80	7	88
Concrete transit mixer	80	10	15	7	81
Roller	85	3	10	7	79
Forklift	75	2	65	7	76
Dozer	85	2	65	6	85
Excavator	85	1	30	7	79
Other construction equipment	85	3	45	7	86
Phase: Placement of Precast Concrete Box Girders					
Crane	85	3	75	7	88
Other construction equipment	85	2	75	7	86
Other material handling equipment	85	6	70	7	91

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-5 Scenario for Elevated Structure Construction (Santa Fe Springs-Norwalk)

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Phase: Utility Relocation					
Concrete transit mixer	85	1	2	7	67
Haul truck	84	2	10	7	76
Front end loader	80	1	65	7	78
Trencher	80	1	20	7	72
Other material handling equipment	85	4	40	7	86
Phase: Foundation and Column Construction					
Front end loader	80	4	56	7	83
Crane	85	9	40	7	90
Drill rig	85	4	70	6	88
Concrete pumper	82	6	80	7	88
Concrete transit mixer	80	10	15	7	81
Roller	85	3	10	7	79

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Forklift	75	2	65	7	76
Dozer	85	2	65	6	85
Excavator	85	1	30	7	79
Other construction equipment	85	3	45	7	86
Phase: Placement of Precast Concrete Box Girders					
Crane	85	3	75	7	88
Other construction equipment	85	2	75	7	86
Other material handling equipment	85	6	70	7	91

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-6 Construction Scenarios for Grade Separation Roadway Improvements

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Level 1: Minor Work Required					
Front end loader	80	1	60	7	77
Crane	85	1	60	7	82
Flatbed truck	84	1	75	7	82
Other construction equipment	85	2	75	6	--
Level 2: Light Work Required					
Haul truck	84	5	25	7	84
Excavator	85	2	40	6	83
Front end loader	80	3	60	7	82
Concrete pumper	82	2	65	7	83
Drill rig	85	1	45	5	79
Concrete transit mixer	85	10	30	6	89
Crane	85	1	60	7	82
Other construction equipment	85	6	55	6	89
Level 3: Medium Work Required					
Haul truck	84	6	25	7	85
Excavator	85	2	55	6	84
Front end loader	80	3	65	7	82
Concrete pumper	82	2	75	7	83
Drill rig	85	2	30	5	81

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Concrete transit mixer	85	8	25	6	87
Crane	85	1	60	7	82
Flatbed truck	84	2	60	7	84
Other construction equipment	85	6	65	6	90
Roller	85	2	40	7	83
Backhoe	80	1	45	7	76
Plate compactor	82	6	40	7	85
Sweeper	85	1	25	4	76
Surfacing equipment	85	2	50	6	84
Level 4: Heavy Work Required					
Haul truck	84	22	25	7	91
Excavator	85	2	60	6	85
Front end loader	80	3	55	7	82
Concrete pumper	82	2	65	7	83
Drill rig	85	2	50	5	83
Concrete transit mixer	85	10	30	6	89
Crane	85	2	55	7	85
Flatbed truck	84	2	75	7	85
Other construction equipment	85	6	45	6	88
Grader	85	1	45	7	81
Roller	85	2	20	7	80
Trencher	80	1	35	7	75
Plate compactor	82	6	65	7	87
Sweeper	85	1	15	4	74
Surfacing equipment	85	2	45	6	83

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-7 Construction Scenarios for Water Crossings

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Level 1: Minor Work Required					
Crane	85	1	40	7	80
Forklift	75	2	50	7	74
Concrete transit mixer	85	3	25	7	83

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Concrete pumper	82	1	60	7	79
Backhoe	80	2	35	7	78
Plate compactor	82	2	20	7	77
Level 2: Light Work Required					
Haul truck	84	5	25	7	84
Excavator	85	2	45	6	83
Front end loader	80	3	75	7	83
Concrete pumper	82	2	75	7	83
Drill rig	85	2	75	5	85
Concrete transit mixer	85	6	20	6	85
Crane	85	2	45	7	84
Other construction equipment	85	3	45	6	85
Pile driver	101	2	75	6	102
Level 3: Medium Work Required					
Haul truck	84	5	25	7	84
Excavator	85	2	45	6	83
Front end loader	80	3	75	7	83
Concrete pumper	82	2	75	7	83
Drill rig	85	2	75	5	85
Concrete transit mixer	85	8	20	6	86
Crane	85	2	45	7	84
Other construction equipment	85	6	45	6	88
Pile driver	101	2	75	6	102

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-8 Construction Scenarios for System Sites (Traction Power Substation, Traction Power Paralleling Station, Traction Power Switching Station, and Communication Towers)

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Haul truck	84	3	35	8	84
Excavator	85	2	55	8	85
Front end loader	80	2	60	8	81
Concrete pumper	82	1	80	8	81
Concrete transit mixer	85	4	35	8	86

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Crane	85	1	40	8	81
Other construction equipment	85	6	75	8	92
Sweeper	85	1	30	8	80
Roller	85	1	40	8	81
Surfacing equipment	85	1	75	8	84

dBA = A-weighted decibel; L_{eq} = equivalent sound level

Table I-9 Scenarios for Station Construction

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Commerce and Buena Park Metrolink Stations					
Excavator	85	1	55	8	82
Front end loader	80	2	70	8	81
Other construction equipment	85	6	75	8	92
Grader	85	1	30	8	80
Roller	85	2	20	8	81
Backhoe	80	1	50	8	77
Plate compactors	82	2	50	8	82
Haul truck	84	4	60	8	88
Flat bed truck	84	2	75	8	86
Norwalk/Santa Fe Springs Station					
Haul truck (6 CY)	84	4	65	7	88
Excavator	85	1	45	6	80
Front end loader	80	2	65	7	81
Flat bed truck	84	2	70	7	85
Other construction equipment	85	4	65	6	88
Haul truck (18 CY)	84	6	55	7	89
Grader	85	1	75	7	83
Roller	85	2	20	7	80
Tractor with backhoe	84	2	65	7	85
Fullerton Station					
Haul truck (6 CY)	84	4	45	7	86
Excavator	85	2	60	6	85
Front end loader	80	4	60	7	83

Equipment Type	Noise Level at 50 feet (dBA)	Number of Pieces	Usage Factor (%)	Hours per Day	L_{eq} at 50 feet (dBA)
Flat bed truck	84	2	65	7	85
Other construction equipment	85	8	15	6	85
Paver	85	1	40	6	80
Grader	85	1	75	7	83
Roller	85	2	20	7	80
Plate compactors	82	3	20	7	79
Haul truck (6 CY) hot asphalt	84	6	45	7	88
Flat bed truck	84	2	65	7	85
Crane: 70 ton	85	2	70	6	85
Crane: 15 ton	85	3	50	7	86
Drill Rig: 36-inch diameter	85	2	65	7	86
Concrete transit mixer (6 CY)	80	8	15	6	80
Concrete pumper	82	4	15	7	79
ARTIC Station					
Haul truck (6 CY)	84	5	75	7	89
Excavator	85	2	65	6	85
Front end loader	80	3	80	7	83
Concrete pumper	82	2	20	7	77
Drill Rig: 36-inch diameter	85	1	30	5	78
Concrete transit mixer (10 CY)	80	10	8	7	78
Crane: 100 ton	85	1	20	7	77
Crane: 15 ton	85	1	30	7	79
Flat bed truck	84	2	40	7	82
Grader	85	1	80	7	83
Paver	85	1	85	7	84
Roller	85	1	55	7	82
Haul Truck (6 CY): hot asphalt	84	2	50	7	83
Plate compactor with generator	82	4	30	6	82
Tractor with backhoe	84	3	60	7	86
Other construction equipment	85	6	50	6	89

ARTIC = Anaheim Regional Transportation Intermodal Center; CY = cubic yards; dBA = A-weighted decibel; L_{eq} = equivalent sound level

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