INSPECTION AND TEST PLAN –
STRUCTURAL STEEL FABRICATION AND INSTALLATION

Project name	
Work zone	
Number	

Rev #	Author	Reviewer	Date
0	Mike Sparrow		

COMPLIANCE AND TEST STANDARDS		
#	**Name**	**Applicable**
1	NZS 3404.1:2009 Materials, fabrication and construction	YES
2	AS/NZS 1554.1:2014 Structural steel welding – Part 1: Welding of steel structures	
3	AS/NZS 1554.2:2014 Structural steel welding – Part 2: Welding of studs	
4	AS/NZS 1554.3:2014 Structural steel welding – Part 3: Welding of reinforcing steel	
5	AS/NZS 1554.5:2014 Structural steel welding – Part 5: Welding of steel structures subject to high levels of fatigue loading	
6	AS/NZS 1554.7:2014 Structural steel welding – Part 7: Welding of sheet steel structures	
7	AS/NZS ISO 3834.3 Quality requirements for fusion welding of metallic materials – Standard quality requirements	
8	AS/NZS ISO 3834.4 Quality requirements for fusion welding of metallic materials – Elementary quality requirements	
9	NZS 3109:1997 Concrete construction – grouting	
10	AS/NZS 1170 Structural design actions	
11	BS EN 12812:2008 Falsework – performance requirements and general design	
12	AS 1576.1:2010 Scaffolding – Part 1 General requirements	

QUALITY ASSURANCE DOCUMENT		
#	**Document type**	**Provided**
1	Structural steel subcontractor's QA system	
2	Weld inspection and non-destructive testing map	
3	Welding procedure specifications (WPS	
4	Fracture control plan	
5	Workshop drawings	
6	Steel mill certificates [International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) accredited laboratory]	
7	Bolt manufacturer's records	
8	Welders' qualifications	
9	Welding inspection and test reports	
10	Bolt torque records	

SPECIFYING DOCUMENTS		
#	**Name**	**Provide**
1	Construction drawings and specification	Dimensions
		Structural arrangement
		Steel grades
		Bolt grades
		Welding requirements
		Surface preparation
		Coating requirements
2	IPENZ Construction Monitoring Services	Describes levels of construction monitoring

APPROVALS		
#	**Document type**	**Provided**
1	Building consent	
2	Design engineer's instruction	
3	PS 4	

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	→								
PRIOR TO STARTING									
Construction monitoring	**Find out the design engineer's construction monitoring requirements**								
	Advise design engineer of structural steel contractor's QA system *(1 = independently certified QA system, 2 = non-independently audited QA system, 3 = no written QA system)*	As per structural steel contractor's QA system	YES	1	Structural steel contractor	**Design Engineer**	n/a	n/a	n/a
	Design engineer advises their construction monitoring regime *(CM1, 2, 3, 4 or 5 – least to most rigorous)* https://www.ipenz.org.nz/ipenz/forms/pdfs/Construction_Monitoring_Services.pdf	1	YES	Outside scope of ITP	Design Engineer	**Design Engineer**	2	Outside scope of ITP	n/a
Welding	**Find out the design engineer's structure specific welding inspection and testing requirements as determined by section 8.1 of NZS 3404.1:2009**								

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	Submit weld inspection and non-destructive testing map based on structure specific welding inspection requirements of NZS 3404.1:2009 and requirements of section 7 of AS/NZS 1554.1 and AS/NZS 1554.5 Types: visual, ultrasonic or radiographic (UT), magnetic particle (MT) and liquid penetrant (LP)	1 and 2 or 5	YES	2	Structural steel contractor	**Design Engineer**	1	2	n/a
	Submit prequalified or tested welding procedures specifications (WPSs) by structural steel subcontractor	1 and 2 or 5	YES	2	Structural steel contractor	**Design Engineer**	1	3	n/a
	Provide welders' qualifications to design engineer	1 and 2 or 5	YES	2	Structural steel contractor	**Design Engineer**	1	3	n/a
	Advise design engineer of the welding (and tensioned bolting) inspector	1, 2 and /or 5	YES		Welding inspector	**Design engineer**	1	2	
Corrosion protection – paint system AND/OR hot dip galvanised OR arc metal sprayed	Refer separate structural steel coatings ITP								
Architecturally exposed structural steel (AESS)	Identify AESS categories 1-4 and C on workshop drawings and erection drawings	1	NO	3	Structural steel contractor	**Design Engineer**	1	3	n/a

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Fracture control plan	Submit fracture control plan (for railway bridges, etc)	1	NO	3	Structural steel contractor	**Design Engineer**	1	3	n/a
Workshop drawings	Submit workshop drawings for approval	1	NO	3	Structural steel contractor	**Design Engineer**	1	3	n/a
PRIOR TO FABRICATION									
Prior to ordering structural steel	Provide steel mill certificates (mandatory requirement for steam and boiler pipe) *Note special requirements where end of life reuse of sections is required regarding member mark stamping and as built shop drawing members schedules*	1	YES	4	Structural steel supplier via structural steel contractor	**Design Engineer**	1	3	Order structural steel
Prior to ordering bolts	Provide mill certificates for tensioned bolts in the connections with moderate or high consequences of failure as nominated by the design engineer	1	YES	7	Bolt supplier via structural steel contractor	**Design engineer**	1	2	Order bolts
Prior to ordering welding consumables	Ensure order complies with approved welding procedure specifications (WPS) – refer also table 4.6.1(A) AS/NZS 1554.1:2011 for prequalified welding consumables	2-5	YES	2, 3	Structural steel contractor	**Design engineer**	1	2	Order welding consumables

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On receipt of materials	Replicate steel grade markings on steel sections to ensure steel grade will be identifiable at all stages of fabrication (mandatory requirement for steam and boiler pipe)	1	YES	1	Structural steel contractor	**Design engineer**	1	2	
	Provide evidence that correct bolts have been received	1	YES	1	Structural steel contractor	**Design engineer**	1	2	
	Provide evidence that correct welding consumables have been received	1	YES	1	Structural steel contractor	**Design engineer**	1	2	Proceed with fabrication
Precambering and straightening hot rolled steel	Ensure correct temperatures are achieved using temperature indicating crayons or a pyrometer [maximum allowable temperature for fracture critical members (FCMs) is 600˚C]	1	YES	1	Structural steel contractor	**Design engineer**	1	2	Continue with fabrication
	Check correct camber of ±5mm achieved	1	YES	1	Structural steel contractor	**Design engineer**	1	2	Continue with fabrication
	Carry out dimensional checks	1	YES	1	Structural steel contractor	**Design engineer**	1	2	Continue with fabrication
	Nominated welding inspection organisation(s) to carry out weld inspections and tests in accordance with the weld map	1	YES	9	Nominated welding inspection organisation	**Design engineer**	1	2	Continue with fabrication
After fabrication									

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	Nominated welding inspection organisation(s) to carry out dimensional tolerance inspections to ensure compliance with section 3.3 of NZS 3404:2009	1	YES	9	Nominated welding inspection organisation	**Design engineer**	1	2	
	Design engineer to carry out checking of deviations in rolled and built up sections for highway and railway bridges	1	YES		Design engineer	**Design engineer**	1	2	Proceed with erection phase of work
DURING ERECTION ON SITE									
Erection method statement	Prepare an erection method statement to address quality, including items such as: Submit falsework and temporary work designs for structural steel erection Obtain from design engineer any requirements for propping to remove dead load *Modification of existing structures* Obtain from design engineer welding sequence required to minimise member distortion								
Falsework and temporary work designs		9 and 10 and /or 11	YES	to be nominated	to be nominated	**Design Engineer**	n/a	3	n/a

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Tensioned bolts (friction type connection)	Advise what method will be used to ensure that bolts are correctly tensioned in accordance with section 8.2 of NZS 3404.1:2009, either by visual scanning of direct-tension indicating washers or verification by measuring permanent stretch in thread spacing (or alternatively by ultrasonic testing)	1	YES	1	Structural steel contractor	**Design engineer**	1	2	
	Ascertain if the standard test for evaluation of slip factor as per section 8.3 of NZS 3404.1:2009 is required	1	YES	1	Structural steel contractor	**Design engineer**	1	2	Proceed with erection
Delivery, storage and handling	Endeavour to check delivered items comply with drawings and specifications – preferably before unloading	1	YES	1	Structural steel contractor	**n/a**	1	n/a	
	Inspect for transportation damage before and after unloading	1	YES	1	Structural steel contractor	**n/a**	1	n/a	Accept delivery
Prechecks prior to erection	Ensure correct grade and length of bolts provided for assembly	1	YES	1	Structural steel contractor	**n/a**	1	n/a	
	Ensure correct welding consumables have been provided	1	YES	1	Structural steel contractor	**n/a**	1	n/a	
Erection	Epoxied fixing studs – refer to and follow separate ITP								
	Welding inspection and testing			4	Nominated inspector	**Design engineer**			Proceed with next stage

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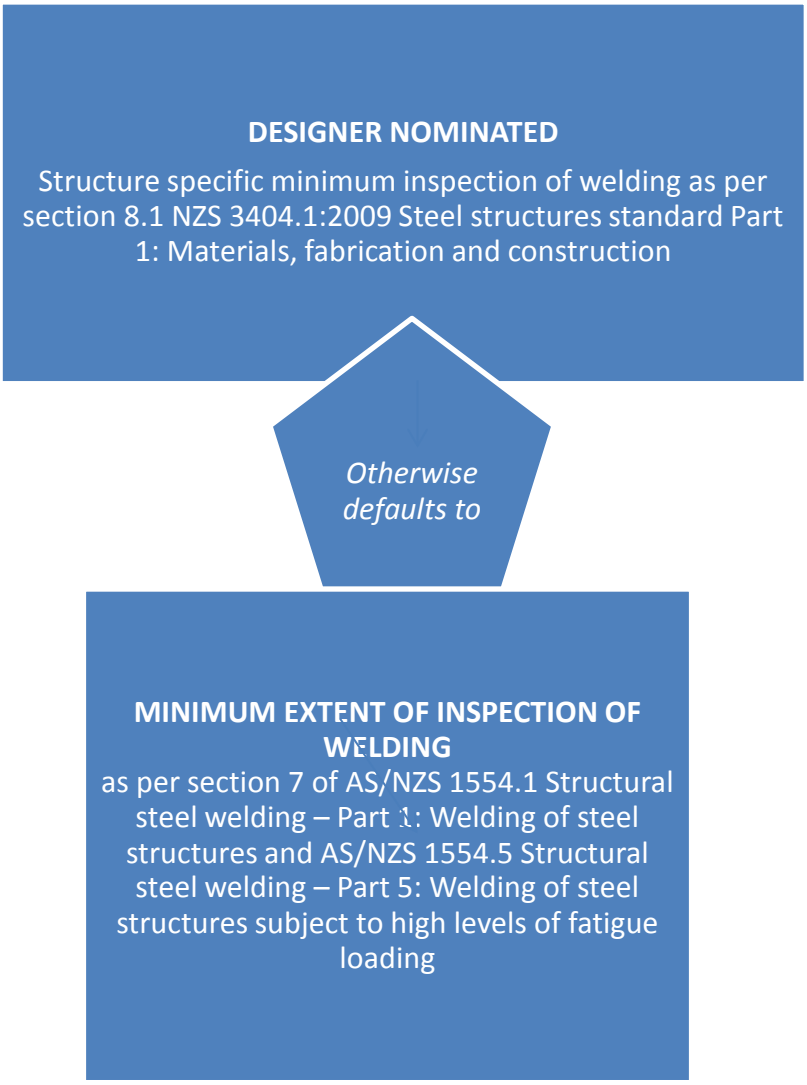
	Tensioned bolts inspection and testing			4	Nominated inspector	**Design engineer**			Proceed with next stage
	Coating – refer to and follow separate ITP								
	Grouting – refer to and follow separate ITP								
Corrective actions (if any)	Non compliance and corrective action reports (if any)					**Design engineer**	1	2	Proceed with corrective actions
	Final inspection					**Design engineer**	1	2	Submit quality assurance documentation
ON COMPLETION OR AFTER CORRECTIVE ACTIONS (IF ANY)									
Submit quality assurance documenta-tion:	Welding inspection and testing reports			9	Nominated inspector	**Design engineer**	1	PS4	n/a
	Bolt tensioning results			10	Nominated inspector	**Design engineer**	1	PS4	n/a
	Dimensional tolerance checks results				Nominated inspector	**Design engineer**	1	PS4	n/a
	Statement of compliance (PS3)				Structural steel fabricator	**Design engineer**	1	PS4	n/a
	Statement of compliance (PS4)				Design engineer	**n/a**	1	n/a	n/a


DESIGNER NOMINATED
Structure specific minimum inspection of welding as per section 8.1 NZS 3404.1:2009 Steel structures standard Part 1: Materials, fabrication and construction
Otherwise defaults to
MINIMUM EXTENT OF INSPECTION OF WELDING
as per section 7 of AS/NZS 1554.1 Structural steel welding – Part 1: Welding of steel structures and AS/NZS 1554.5 Structural steel welding – Part 5: Welding of steel structures subject to high levels of fatigue loading