NO.

JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

MINISTRY OF PUBLIC WORKS
REPUBLIC OF INDONESIA

DETAILED DESIGN STUDY
OF
NORTH JAVA CORRIDOR FLYOVER PROJECT
IN THE REPUBLIC OF INDONESIA

TANGGULANGIN FLYOVER

VOLUME IV DRAWINGS

CONTRACT PACKAGE III
(PETERONGAN - TANGGULANGIN)

DECEMBER 2006

KATAHIRA & ENGINEERS INTERNATIONAL

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JAPAN INTERNATIONAL
COOPERATION AGENCY

DIRECTORATE GENERAL OF HIGHWAY
MINISTRY OF PUBLIC WORKS
REPUBLIC OF INDONESIA

GENERAL

KATAHIRA & ENGINEERS INTERNATIONAL

JICA JAPAN INTERNATIONAL COOPERATION AGENCY / KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name R. UENO	Name T. OKUMURA	Name M. KIUCHI		DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	N T S	INDEX OF DRAWINGS 1 OF 3	TGE-001
	Sign	Sign	Sign	APPROVED BY Ir. HERRY VAZA M.Eng.Sc NIP. : 110038400 Sign				SHEET NO :
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	Sign	Sign	Sign	APPROVED BY Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400 Sign				SHEET NO :
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	Sign		Sign		Sign		APPROVED BY: Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400				SHEET NO :
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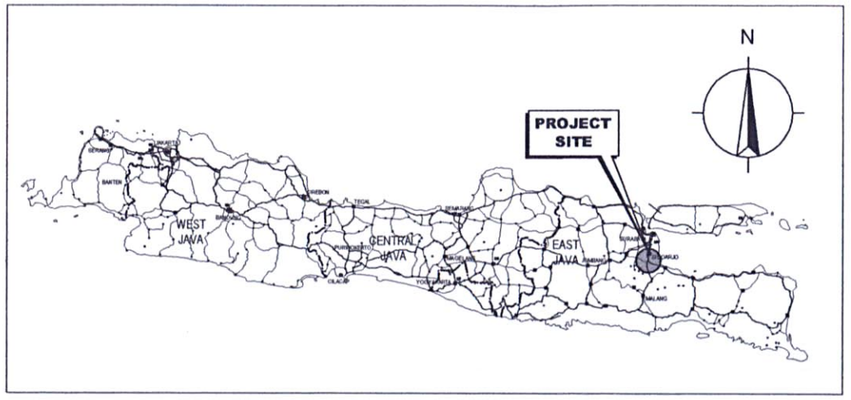
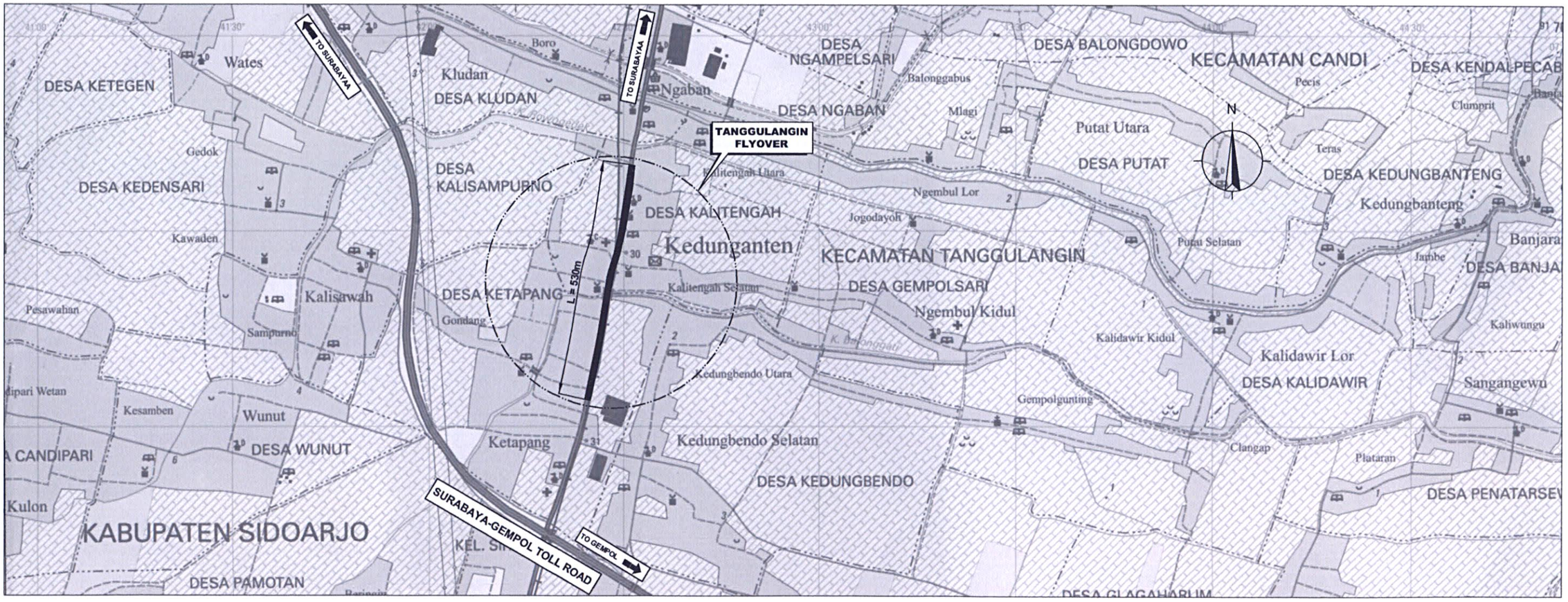
NOT TO SCALE



3 - JAVA ISLAND MAP
NOT TO SCALE



1 - LOCATION / VICINITY MAP
SCALE 1:20000

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NOTATION AND LEGEND

- P1 — PERMANENT BUILDING (1 FLOOR)
- P2 — PERMANENT BUILDING (2 FLOORS)
- P3 — PERMANENT BUILDING (3 FLOORS)
- SP — SEMI PERMANENT BUILDING
- T — TEMPORARY
- SH — SHED (BANGSAL)
- ST — STALL (KIOS)
- GOVERNMENT OFFICE
- SCHOOL
- MOSQUE
- CHURCH
- TEMPLE
- ISLAMIC CEMETERY
- CHRISTIAN CEMETERY
- CHINESE CEMETERY
- BANK
- T — WAREHOUSE
- HOSPITAL/CLINIC
- H — HOTEL
- F — FACTORY
- PK — FIRE STATION
- P — POST OFFICE
- MARKET
- GS — GASOLINE STATION
- TELEPHONE POLE
- ELECTRICAL POLE
- POWER HOUSE
- GPS STATION
- BENCH MARK
- TRAVERSE POINT
- TS, SC, CS, ST OR TC, CT OF HORIZONTAL CURVE
- POINT INTERSECTION OF VERTICAL CURVE
- +10 +5 — CONTOURS
- STREAM
- RIVER
- POND (WATER)
- DRAINAGE
- SWAMP
- RICE FIELD
- WASTED LAND
- MONUMENT
- EXISTING RCP
- DESIGN RCP
- EXISTING BOX CULVERT
- DESIGN BOX CULVERT
- EXISTING BRIDGE
- DESIGN BRIDGE
- ROW
- MATCH LINE
- CENTER LINE
- 0+200 — STATION NUMBER
- RETAINING WALL
- RAILWAY
- MAIN ROAD
- ROAD
- W — WATER SUPPLY
- T — TELEPHONE LINE
- CO — CABLE OPTIC LINE
- E — ELECTRICAL LINE
- G — GAS LINE
- O — OIL LINE
- BH – 10 — BORE HOLE NO. 10
- S – 4 — SOUNDING NO.4 (DCP TEST)
- DC — DRAINAGE CATCH BASIN
- DMH — DRAINAGE MANHOLE
- EXISTING DRAINAGE LINE
- NEW DRAINAGE LINE

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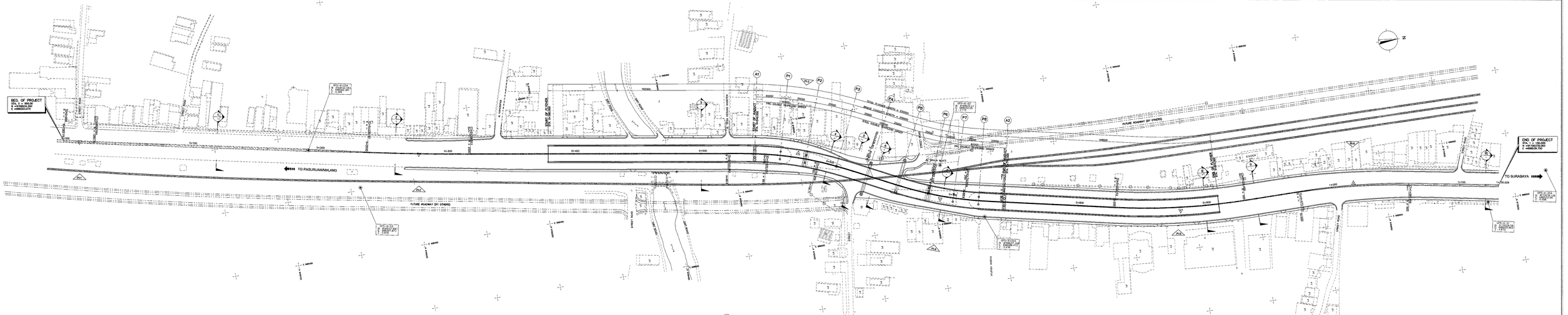
ABBREVIATIONS

A	A	PARAMETER OF CLOTHOID CURVE
	A	AMPERE
	@	AT THE RATE
	ABUT	ABUTMENT
	A.C	ASPHALTIC CONCRETE
	A.D	AVERAGE DEPTH
	ADD.	ADDITIONAL
	A.D.T.	AVERAGE DAILY TRAFFIC
	ALIGN	ALIGNMENT
	AHD.	AHEAD
	ALT.	ALTERNATE
	APPR.	APPROACH
	APPROX	APPROXIMATE
	ASPH	ASPHALT
	AVE	AVERAGE
	AZ.	AZIMUTH
B	B	WIDTH
	b	BOTTOM WIDTH
	b'	WIDENING
	B/B	BACK TO BACK
	B	BASE COURSE
	BC	BOX CULVERT
	BEG	BEGINNING
	BIT	BITUMINOUS
	BK	BACK
	℄	BASELINE
	BLDGS	BUILDINGS
	BLVD	BOULEVARD
	B.M	BENCH MARK
	BOT.	BOTTOM
	BR.	BRIDGE
	BP.	BEGINING POINT
	BRG.	BEARING
	B.S	BACK SLOPE
	B.S.T	BITUMINOUS SURFACE TREATMENT
	B.T.C	BEGINNING TRANSITION CURVE
	B.V.C.S.	BEGINNING OF VERTICAL CURVE SPIRAL
C	C	CUT
	(C)	COMPUTED
	C/C	CENTRE TO CENTRE
	CA.C.P	CORRUGATED ALUM CULVERT PIPE
	C.A.P.A.	CORRUGATED ALUM PIPE ARCH
	CEM.	CEMETERY
	C.F.P	CORNER FENCE POST
	C.I.P	CAST IRON PIPE
	℄	CENTER LINE
	CLASSIF	CLASSIFICATION
	CLR.	CLEARANCE
	CM	CENTIMETER
	C.M.C.P.	CORRUGATED METAL CULVERT PIPE
	C.M.P.A	CORRUGATED METAL PIPE ARCH
	COMB.	COMBINE
	COMP.	COMPACTED
	CONC.	CONCRETE
	CONT	CONTACTOR
	CORT.	CORPORATION
	CORR.	CORRUGATED
	C.R	CRUSHED ROCK
	C.S	CIRCLE TO SPIRAL, CURVE SPIRAL
	CULV.	CULVERT
	CU.M	CUBIC METER
	X-SECTION	CROSS SECTION
D	D	DIAMETER, ø
		DEFORMED REBAR
		INNER DIAMETER (PIPE)
		DEGREE OF CURVE
	DD	DECK DRAIN
	Do	OUTER DIAMETER
	d	DISTANCE
	DMH	DRAINAGE MANHOLE
	△	DEFLECTION ANGLE OR CENTRAL ANGLE AT ANY P.I
	△i	FIELD ANGLE
	△c	DEFLECTION ANGLE OR CIRCULAR ARC OF LENGTH Lc
	DET.	DETAIL
	DF.	DRIFT
	D.H.V	DESIGN HOUR VOLUME
	DIA.,ø	DIAMETER
	DIM	DIMENSION
	DIST	DISTRICT
	D.I	DROP INLET
	D.S.W	DWARF STONE WALL
	D.B.S.T	DOUBLE BITUMINOUS SURFACE TREATMENT
	DWG.	DRAWING
E	E	EXTERNAL DISTANCE OF CIRCULAR CURVE
	Es	EXTERNAL DISTANCE OF SPIRAL -CIRCLE-SPIRAL
	Ev	MIDDLE ORDINATE VERTICAL CURVE
	e	SUPERELEVATION CURVE
	e max	MAX. SUPERELEVATION RATE
	EL	ELEVATION
	EMB	EMBANKMENT
	EP	END POINT
	E.P.S.D	EROSION PROTECTION TO SIDE DRAIN
	EST	ESTATE
	E.T.C.	END TRANSITION CURVE
	E.V.C.S.	END OF VERTICAL CURVE SPIRAL
	E'WKS	EARTH WORKS
	EXC	EXCAVATION
	EXP	EXPANSION
	EXIST	EXISTING
	EXT	EXTERIOR
	EXN	EXTEND
F	F	FILL
	F.C	FULL CROWN
	FDN	FOUNDATION
	F.D.P	FULL DEPTH PAVEMENT
	F.G	FINISH GRADE
	FL.	FLOOR
	F L	FLOW LINE
	FR	FRAME
	FT	FOOT (FEET)
	FWD.	FORWARD
G	G	GARAGE
	G.F	GUARD FENCE
	GL	GROUND LEVEL
	G.R	GUARD RAIL
	GOVT.	GOVERNMENT
H	H.C	HALF CROWN
	HDWL	HEADWALL
	HORIZ	HORIZONTAL
	H.P	HIGH POINT
	H.R	HAND RAIL
	HT	HEIGHT
	H.W.L	HIGH WATER LEVEL
	H.W.Y	HIGHWAY
	HZ	FREQUENSY
I	△OR I	INTERSECTION ANGLE
	INL.	INLET
	INT.	INTERIOR
	INTERS	INTERSECTION
	INV	INVERT
J	JT.	JOINT
K	KG.	KILOGRAM
	KM.	KILOMETER
	KPH/kph	KILOMETER PER HOUR
	KWH	KILO WATT HOUR
	LAB	LABORATORY
L	L OR LC	LENGTH OF CIRCULAR CURVE
	L'	LENGTH OF CIRCULAR CURVE IN SPIRALED CURVE
	Ln M	LINEAR METER
	Ls	LENGTH OF SPIRAL
	LL	LENGTH OF LEFT OFFSET
	LP	LIGHTING PANEL
	LR	LENGTH OF RIGHT OFFSET
	Lt	LENGTH OF TRANSITION
	Lv, V.C	LENGTH OF VERTICAL CURVE
	LONG	LONGITUDINAL
	L.S	LEVELING SECTION
	L.S.D	LINE SIDE DRAIN
	LT	LEFT
	LTH	LENGTH
	L.F	LEFT FORWARD
M	M	METER
	M	LINEAR METER
	M M, m/m	METER PER METER
	MAINT	MAINTENANCE
	MAX	MAXIMUM
	MCB	MINIATURE CIRCUIT BREAKER
	M.D	MAXIMUM DEPTH
	MN	MANHOLE
	MPa	Mega Pascal
	MIN	MINIMUM
	M.O	MIDDLE ORDINATE
	MOD	MODIFIED
	MON	MONUMENT
	M.R	METER RADIAL
	MSW	MORTAR STONE WORK
N	N	NEW
	N.C	NORMAL CROWN
	N.E	NORTH EAST
	NO.	NUMBER
	N.S.D	NEW SIDE DRAIN
	NTS	NOT TO SCALE
	N.W	NORTH WEST
	N.W.L	NORMAL WATER LEVEL
	N.W.R	NO WORK REQUIRED
O	OUTL.	OUTLET
P	%	PERCENT
	PART	PARTIAL
	PAVMT	PAVEMENT
	P.C	POINT OF CURVATURE
	PC	PRESTRESSED CONCRETE
	P/C	PRE-CAST
	P.C. CONC	PORTLAND CEMENT CONCRETE
	P.C.C	POINT OF COMPOUND CURVE
	P.C.T	POINT OF COMMON TANGENCY
	P.D	PRIVATE DRIVE
	P.I	POINT OF INTERSECTION
	PJU	PENERANGAN JALAN UMUM (PUBLIC ROAD LIGHTING)
	℄ OR ⌀	PLATE
	P.L	PROPERTY LINE
	P.O.C	POINT ON CURVE
	P.O.T	POINT ON TANGEN
	P.P	POWER POLE
	P.R.C	POINT ON REVERSE CURVE
	PREST	PRESTRESSED
	PROCJ	PROJECTION
	PROP	PROPOSED
	P.T	POINT OF TANGENCY
	PVC	POINT OF VERTICAL CURVATURE
		POLY VINYL CHLORIDE
	P.V.I	POINT OF VERTICAL INTERSECTION
	P.V.R.C	POINT OF VERTICAL REVERSE CURVATURE
	P.V.T	POINT OF VERTICAL TANGENCY
R	R	RADIUS OF CURVE
	RCSC	REINFORCED CONCRETE SLAB CULVERT
	RCBC	REINFORCED CONCRETE BOX CULVERT
	R.C.P	REINFORCED CONCRETE PIPE
	R.C.P.A	REINFORCED CONCRETE PIPE ARCH
	RD	ROAD
	RDWY	ROADWAY
	REINF	REINFORCING OR REINFORCEMENT
	REL	RELOCATED
	REPL	REPLACED
	REQ'D	REQUIRED
	RES	RESIDENTIAL
	RES'D	RE-EXCAVATED SIDE DRAIN
	REST	RESTAURANT
	R.H	RIGHT HAND
	ROD	RUN OF DRAIN
	ROW,R/W	RIGHT OF WAY
	R.P	REFERENCE POINT
	R.R	RAILROAD
	RT	RIGHT
	R.F	RIGHT FORWARD
	RLWY	RAILWAY
	REROD	RE-EXCAVATED ROD
S	S	SLOPE
	SALV	SALVAGE
	S.C	SPIRAL TO CIRCLE, SPIRAL - CURVE
	SCH	SCHOOL
	SCN	HIGH PRESSURE SODIUM LAMP
	S.C.S	SPIRAL CURVE SPIRAL
	S.E	SOUTH EAST
	SECT	SECTION
	SEP	SEPTIC TANK
	S.D	SIDE DITCH
	S.G	SUBGRADE
	SH	SHOULDER
	SHR	SHRINKAGE
	SL	SLOOPING
	SO	SOUTH
	SP	SPECIAL
	S.P.S	STRUCTURAL PLATE ARCH
	SPECS	SPECIFICATIONS
	S.P.P	STRUCTURAL PLATE PIPE
	S.P.P.A	STRUCTURAL PLATE PIPE ARCH
	SQ	SQUARE
	SQM	SQUARE METERS
	S.S	SERVICE STATION
	SS	SPIRAL - SPIRAL
	S.ST	SINGLE SURFACE TREATMENT
	S.T	SPIRAL OF TANGENT
	STA	STATION
	STD	STANDARD
	STIRR	STIRRUP
	STR	STRUCTURAL
	SUBD	SUBDIVISION
	SUM	SUMATRA
	SURF.	SURFACE
	SW	SIDEWALK
	S.W	SOUTH WEST
	SYMM	SYMMETRICAL
T	T	TANGENT LENGTH OF CURVE
	TAN	TANGENT
	T.B.M	TEMPORARY BENCH MARK
	TC	TANGENT CURVE
	θ	THETA ANGLE, CENTRAL ANGLE OF SPIRAL
	TEM	TEMPORARY
	THK	THICKNESS
	T.K.P	TRAVERSE CONTROL POINT
	T.L	TRANSIT LINE
	T.S	TANGENT SPIRAL
	Ts	TANGENT LENGTH OF SPIRALED CURVE
	T.T	TRANSMISSION TOWER
	TYP	TYPICAL
U	U	URBAN
V	V	VOLTAGE
	VA	VOLT AMPERE
	VAR	VARIES
	V,VEL	VELOCITY
	V.C	VERTICAL CURVE
	VERT	VERTICAL
W	W	WELL,WATT
	W.B	WATER BOUND MACADAM
	WD	WOOD
	WGT	WEIGHT
	WH	WAREHOUSE
	W/O	WITHOUT
	W.R	WORK REQUIRED
	W.S	WATER SERVICE
	W.T	WATER POWER
	W.W	WING WALL
	1R	NUMBER OF GROUP PHASE.R
	2S	NUMBER OF GROUP PHASE.S
	3T	NUMBER OF GROUP PHASE.T

JICA JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY Name: R. UENO Sign: Date:	CHECKED BY Name: T. OKUMURA Sign: Date:	SUBMITTED BY Name: M. KIUCHI Sign: Date:	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS APPROVED BY: Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400 Sign: Date:	PROJECT AND LOCATION : DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	SCALE : 1 : 1000 FULL SIZE A3	DRAWING TITLE : GENERAL DEVELOPMENT PLAN

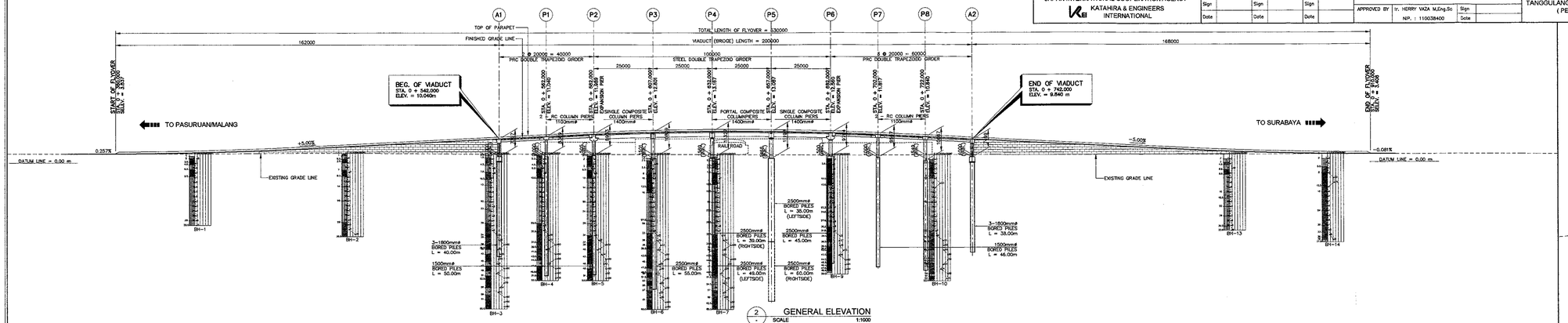
DRAWING NO : TGE-007

SHEET NO : 07 / 19



1 GENERAL DEVELOPMENT PLAN
SCALE 1:1000

JAPAN INTERNATIONAL COOPERATION AGENCY / KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name: R. UENO	Name: T. OKUMURA	Name: M. KIUCHI		DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	AS SHOWN	FLYOVER GENERAL PLAN, ELEVATION & SECTIONS	TGE-008
	Sign	Sign	Sign	APPROVED BY: Ir. HERRY VAZA M.Eng.Sc (Sign)				SHEET NO :
	Date	Date	Date	NIP. : 110038400 (Date)		FULL SIZE A3		08 / 19



2 GENERAL ELEVATION
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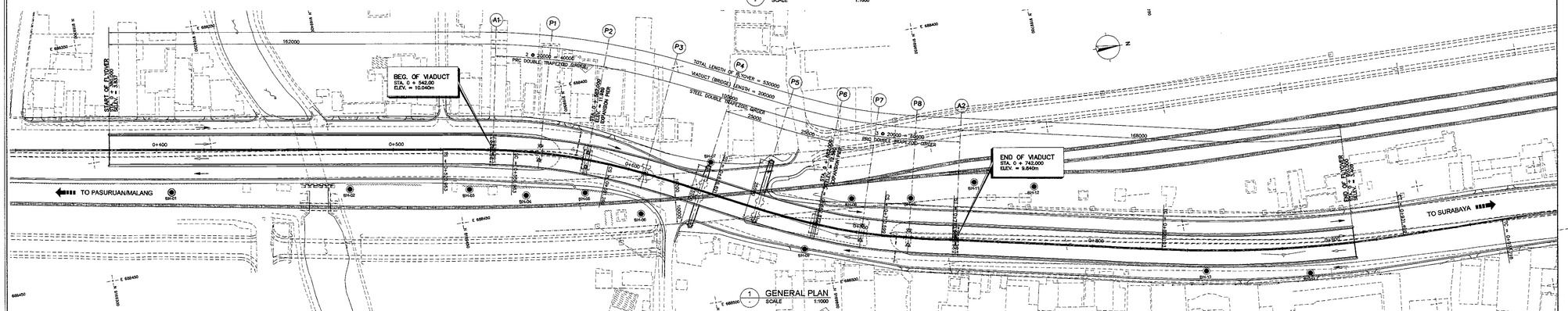
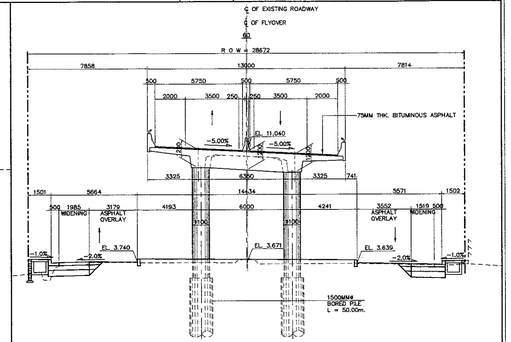
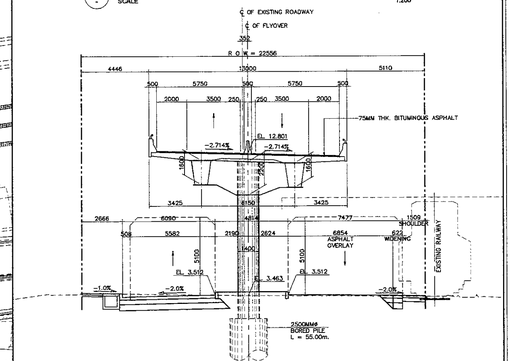


1 GENERAL PLAN
SCALE 1:1000



3 SECTION @ PIER (P1) PRC DOUBLE TRAPEZOID GIRDER (DOUBLE COLUMN)
SCALE 1:200



4 SECTION @ PIER (P3) STEEL DOUBLE TRAPEZOID GIRDER (SINGLE COLUMN)
SCALE 1:200

GENERAL NOTES ROADS AND DRAINAGE

1. DESIGN STANDARDS / SPECIFICATIONS

1.1. ALL GEOMETRIC AND PAVEMENT DESIGN STANDARDS SHALL COMPLY WITH THE VALUES PRESCRIBED IN:

- STANDARD SPECIFICATION FOR URBAN ROADS, RSNI T-14-2004
- STANDARD SPECIFICATIONS FOR GEOMETRIC DESIGN OF URBAN ROAD, BINA MARGA, 1992.
- A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 2004 EDITION OF THE AMERICAN ASSOCIATION OF STATE HIGHWAYS AND TRANSPORTATION OFFICIALS (AASHTO).
- ROADS STRUCTURE ORDINANCE JAPAN ROAD ASSOCIATION (JRA), 2004 EDITION
- GUIDE FOR DESIGN OF PAVEMENT STRUCTURES, (AASHTO), 1993.

1.2. ALL WORKS SHALL COMPLY WITH THE BINA MARGA STANDARD SPECIFICATIONS , AND OTHER SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS PERTAINING TO THIS PROJECT.

2. SURVEY CONTROLS AND REFERENCES

2.1 HORIZONTAL CONTROL IS BASED THROUGH GLOBAL POSITIONING SYSTEM (GPS) ESTABLISHED BY PT. VIRAMA KARYA. LIST OF SURVEY CONTROLS ARE SHOWN IN THE SUCCEEDING SHEETS.

2.2 . VERTICAL CONTROL IS REFERRED FROM "JARING KONTROL VERTICAL NASIONAL (TITIK TINGGI GEODESI = TTD)" ESTABLISHED DATUM.

2.3 . ALL CONTROLS SHALL BE VERIFIED BEFORE CONSTRUCTION, THE CONTRACTOR SHALL INVESTIGATE ALL DRAWING PLANS AND CONDUCT FIELD INVESTIGATION SURVEY TO DETERMINE ACTUAL FIELD CONDITION. THE CONTRACTOR SHALL REPORT TO THE ENGINEER IF THERE ARE DIFFERENCES BETWEEN DRAWING PLANS AND ACTUAL FIELD CONDITIONS .

3. ALIGNMENT CONTROLS AND REFERENCES

3.1 . PROJECT IMPLEMENTATION OF ALL FLYOVERS SHALL BE DONE IN THREE (3) CONSTRUCTION PACKAGES:

CONTRACT PACKAGE 1 – MERAK AND BALARAJA FLYOVERS
CONTRACT PACKAGE 2 – NAGREG AND GEBANG FLYOVERS
CONTRACT PACKAGE 3 – PETERONGAN AND TANGGULANGIN FLYOVERS

3.2 . TANGGULANGIN FLYOVER HAS THE FOLLOWING MAJOR CONTROL POINTS USED IN THE DESIGN OF HORIZONTAL AND VERTICAL ALIGNMENT:

- EXISTING RAILWAY CROSSING
- RIGHT - OF - WAY OF PT.KAI RAILWAY
- EXISTING RAILWAY GRADIENT
- EXISTING ROADWAY WIDTH
- ADJACENT BUILT - UP AREAS

4. DIMENSIONS

4.1. DISTANCES AND ELEVATIONS SHOWN ON THE PLANS ARE IN MILLIMETERS (mm) AND METERS (m) UNLESS OTHERWISE SPECIFIED. OTHER UNITS OF MEASUREMENT ARE EXPRESSED IN THE MORE APPROPRIATE UNITS OF THE INTERNATIONAL SYSTEM OF UNIT (METRIC) .

4.2. CONTRACTOR SHALL CLARIFY TO THE ENGINEER ALL DIMENSIONS AND ELEVATIONS SHOWN IN THE DRAWINGS BEFORE CONSTRUCTION.

5. STATIONINGS

5.1. THE STATIONINGS OF HORIZONTAL ALIGNMENT OF THE PROJECT ROAD ARE RELATIVE TO THE CENTERLINE SHOWN ON THE PLANS.

5.2. STATIONING OF CURB INLET MANHOLE, MANHOLE, BEGINNING AND END OF FLYOVER AND OTHER STRUCTURES ARE RECKONED AT THE CENTERLINE STATIONINGS SHOWN ON THE PLANS.

5.3. ELEMENTS OF CURVE, BOTH HORIZONTAL AND VERTICAL ALIGNMENTS ARE RELATIVE TO THE ROAD CENTERLINE.

5.4. SERVICE ROADS STATIONING ARE BASED FROM DESIGN CENTERLINE OF THE ROAD/ FLYOVER.

6. ELEVATIONS AND GRADES

6.1. FINISHED GRADE ELEVATIONS SHOWN ON PROFILE SHEETS REFER TO FINISHED ROAD LEVEL SHOWN IN TYPICAL ROADWAY SECTIONS.

EXISTING GRADE LEVEL SHOWN ON PROFILE SHEETS REFER TO THE PAVEMENT ORIGINAL GROUND ALONG THE CENTERLINE OF THE PROJECT ROAD AS SHOWN IN THE TYPICAL ROADWAY SECTIONS, OR AS INDICATED IN THE PLANS.

7. REMOVAL OF EXISTING STRUCTURES AND RELOCATION OR PROTECTION OF EXISTING UTILITIES

7.1. REMOVAL OF EXISTING BUILDINGS, HOUSES, FENCES, UTILITY POLES, PUBLIC UTILITIES, ETC. WILL NOT BE THE RESPONSIBILITY OF THE CONTRACTOR; THEY WILL BE REMOVED BY THEIR RESPECTIVE OWNERS OR BY BINA MARGA PRIOR TO CONSTRUCTION.

7.2. DISPOSAL OR REPLACEMENT OF SACRED BUILDING SHALL BE APPROVED BY THE LOCAL GOVERNMENT.

7.3. PORTION OF UTILITIES, SUCH AS WATER LINES, TELEPHONE TRUNK LINES, ELECTRIC LINES, ETC., THAT MAY OBSTRUCT THE CONSTRUCTION OF THE PROJECT SHALL BE RELOCATED BY THE ENTITIES OR OWNERS CONCERNED. EXTREME PRECAUTION SHALL BE EXERCISED BY THE CONTRACTOR SO AS NOT TO DAMAGE THE EXISTING UTILITIES DURING CONSTRUCTION. ANY DAMAGE THEREOF SHALL BE ON THE ACCOUNT OF THE CONTRACTOR.

7.4. UTILITIES WHICH HAVE SPECIAL CHARACTER LIKE GAS AND OIL PIPE SHALL BE PECULIARY TREATED WITH MUCH IMPORTANCE. IF IT NEED TO BE RELOCATED OR PROTECTED, THEN IT MUST BE DONE BEFORE THE CONSTRUCTION COMMENCE. WRITTEN APPROVAL / PERMISSION SHALL BE GIVEN TO THE CONTRACTOR BY THE UTILITIES OWNER THROUGH THE ENGINEER OR THE SUPERVISION CONSULTANT.

7.5. SUPPORTS FOR ABOVE GROUND UTILITIES TO BE RELOCATED/ REPLACED SHALL BE PLACED IN SUCH A WAY THAT THEY WILL NOT OBSTRUCT VEHICULAR AND PEDESTRIAN MOVEMENTS.

8. ROAD CONNECTIONS AND PRIVATE ENTRANCES

8.1. APPROACHES AND CONNECTIONS SHALL BE CONSTRUCTED BY THE CONTRACTOR AS SHOWN ON THE PLAN OR AS DIRECTED BY THE ENGINEER IN SUCH MANNER AS TO ENSURE SMOOTH CONNECTION AND RIDING QUALITY.

8.2. EXACT LOCATIONS OF INTERSECTION ROADS, AND PRIVATE ENTRANCES OR DRIVEWAYS WHERE ITEM 8.1 ABOVE APPLIES, SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.

8.3. DROP CURB AND GUTTER OR MOUNTABLE CURB AND GUTTER SHALL BE PROVIDED TO EXISTING ENTRANCES OR DRIVEWAYS AS SHOWN IN THE PLAN.

8.4. CURB - CUT RAMP SHALL BE PROVIDED AT SIDEWALK AND MEDIAN AS SHOWN IN THE STANDARD DRAWINGS THESE ARE INTENDED SPECIALLY FOR PEDESTRIANS WITH DISABILITY. LOCATIONS SHALL BE AS DIRECTED BY THE ENGINEER.

8.5. LIMIT OF CONSTRUCTION FOR ROAD CONNECTIONS AND PRIVATE ENTRANCES SHALL BE AS SHOWN IN THE DRAWING OR AS DIRECTED BY THE ENGINEER.

9. DRAINAGE STRUCTURE

9.1. EXACT LOCATIONS, SLOPES, OUTFALLS, AND INVERT ELEVATIONS OF DRAINAGE STRUCTURES SHALL BE CHECKED IN THE FIELD BY THE ENGINEER, MINOR ADJUSTMENTS MAY BE MADE TO SUIT ACTUAL FIELD CONDITIONS UPON APPROVAL BY THE ENGINEER.

9.2. EXISTING DRAINAGE STRUCTURES THAT ARE FAULTY, BROKEN DOWN, OR NOT IN GOOD WORKING CONDITION SHALL BE DETERMINED IN THE FIELD. RECONSTRUCTION, REPAIR AND / OR REPLACEMENT OF SAME SHALL BE DIRECTED BY THE ENGINEER, AND SHALL CONFORM TO THE STANDARDS SHOWN IN THE DRAWINGS.

9.3. EXISTING DRAINAGE STRUCTURES OR PARTS THEREOF REMOVED BY THE CONTRACTOR THAT ARE STILL SERVICEABLE SHALL BE TURNED OVER TO THE GOVERNMENT AND SHALL BE DEPOSITED AT A PLACE DESIGNATED BY THE ENGINEER. EXTREME PRECAUTIONS SHALL BE EXERCISED BY THE CONTRACTOR NOT TO DAMAGE THESE MATERIALS DURING REMOVAL AND HANDLING OPERATION.

9.4. CLEANING , UNCLOGGING AND/ OR RELAYING OF REINFORCED CONCRETE PIPES, CLEANING OF CHANNELS AND DITCHES AS DIRECTED BY THE ENGINEER SHALL BE UNDERTAKEN BY THE CONTRACTOR TO ENSURE AN OPERATIONAL TEMPORARY DRAINAGE SYSTEM DURING THE CONSTRUCTION PERIOD.

9.5. LAYOUT OF EXISTING SIDE DITCH, PIPE CULVERT, AND BOX CULVERT ARE BASED FROM TOPOGRAPHIC SURVEY. EXACT LOCATION AND DEPTH SHALL BE VERIFIED IN THE FIELD PRIOR TO THE CONSTRUCTION.

9.6. ALL INVERT ELEVATIONS OF EXISTING PIPES AND BOX CULVERTS SHALL BE VERIFIED PRIOR TO CONSTRUCTION IN ORDER TO SMOOTHLY JOIN TO THE NEW DRAINAGE SYSTEM.

10. ROAD SIGN AND PAVEMENT MARKINGS

10.1. ROAD SIGNS SHALL CONFORM WITH THE " DINAS PERHUBUNGAN LALU LINTAS DAN ANGKUTAN JALAN SETEMPAT "

10.2. PAVEMENT MARKINGS OR ROAD MARKINGS SHALL CONFORM WITH THE " DINAS PERHUBUNGAN LALU LINTAS DAN ANGKUTAN JALAN SETEMPAT "

10.3. INSTALLATION OF ROAD SIGNS AND PAVEMENT MARKINGS SHALL BE APPROVED BY THE ENGINEER.

11. TRAFFIC MANAGEMENT

11.1. DURING THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL INSTALL TRAFFIC MANAGEMENT SIGN WHICH WILL PROVIDE SAFETY, CONVENIENCE, AND SMOOTH RIDING QUALITY OF MOTORISTS IN ACCORDANCE WITH THE TRAFFIC REGULATIONS. WRITTEN APPROVAL / PERMISSION SHALL BE GIVEN BY THE ENGINEER AND THE " DINAS PERHUBUNGAN LALU LINTAS & ANGKUTAN SETEMPAT " TO THE CONTRACTOR PRIOR TO IMPLEMENTATION.

GENERAL NOTES FOR STRUCTURES (1)

GENERAL

1. IN THE INTERPRETATION OF DRAWINGS, INDICATED DIMENSIONS SHALL GOVERN ALL DIMENSIONS. DISTANCES AND SIZES SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES.
2. ELEVATIONS, STATIONS AND COORDINATES ARE SHOWN IN METERS, OTHER DIMENSIONS AND MEMBER SIZES ARE IN MILIMETERS UNLESS OTHERWISE INDICATED.

DESIGN CRITERIA

1. DESIGN SPECIFICATIONS

1.1 CODES AND STANDARDS

THE NORTH JAVA CORRIDOR FLYOVER PROJECT SHALL BE DESIGNED IN ACCORDANCE WITH THE FOLLOWING DESIGN CODES AND STANDARDS.

- BRIDGE DESIGN CODE, DRAFT, VOLUME 1 AND VOLUME 2-BRIDGE MANAGEMENT SYSTEM 1992, DIREKTORAT JENDERAL BINA MARGA DEPARTEMEN PEKERJAAN UMUM.
- BRIDGE DESIGN MANUAL, DRAFT, VOLUME 1 AND VOLUME 2-BRIDGE MANAGEMENT SYSTEM 1992, DIREKTORAT JENDERAL BINA MARGA DEPARTEMEN PEKERJAAN UMUM.
- PEMBEBANAN UNTUK JEMBATAN, RSNI4. *(LOADING FOR BRIDGES)*
- STANDAR PERENCANAAN KETAHANAN GEMPA UNTUK JEMBATAN, SNI. *(DESIGN STANDARD OF EARTHQUAKE RESISTANCE FOR BRIDGES)*
- PERENCANAAN STRUKTUR BETON UNTUK JEMBATAN, RSNI *(DESIGN OF CONCRETE STRUCTURE FOR BRIDGE)*
- PERENCANAAN STRUKTUR BAJA UNTUK JEMBATAN, RSNI4 *(DESIGN OF STEEL STRUCTURE FOR BRIDGE)*
- AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 3RD EDITION.

1.2 OTHER REFERENCE

FOR DESIGN REQUIREMENTS NOT COVERED BY THE ABOVE CODES AND STANDARDS THE FOLLOWING REFERENCES WILL BE USED AS REQUIRED:

- JAPANESE SPECIFICATIONS FOR HIGHWAY BRIDGES
- AS 5100, BRIDGE DESIGN, AUSTRALIAN STANDARD, 2004
- EN 1994 EUROCODE 4: DESIGN OF COMPOSITE STEEL AND CONCRETE STRUCTURES
- FHWA-IF-99-025, "DRILLED SHAFTS: CONSTRUCTION PROCEDURES AND DESIGN METHODS", 1999
- FHWA-NHI-00-043, "MECHANICALLY STABILIZED EARTH WALLS AND REINFORCED SOIL SLOPES, DESIGN & CONSTRUCTION GUIDELINES", 2001
- NCHRP REPORT 529, "GUIDELINES AND RECOMMENDED STANDARD FOR GEOFOAM APPLICATIONS IN HIGHWAY EMBANKMENTS", TRANSPORT RESEARCH BOARD, 2004

2. LOADING SPECIFICATIONS

THE LOADING SPECIFICATIONS TO BE USED FOR THE DESIGN OF STRUCTURES ARE THE "PEMBEBANAN UNTUK JEMBATAN, RSNI 4" (LOADING FOR BRIDGES).

ACCORDING TO THE ABOVE SPECIFICATIONS, BASIC DESIGN CONDITION ARE AS FOLLOWS :

2.1 LOADING CLASSIFICATIONS

100% "D" (LANE LOADING) AND 100% "T" (TRUCK LOADING) ARE APPLIED

2.2 APPLICATION OF "D" LOADING

THE UDL MAY BE APPLIED IN BROKEN LENGTHS TO MAXIMIZE ITS EFFECTS ON CONTINUOUS BRIDGES OR UNUSUAL STRUCTURES

A SINGLE KEL PERPENDICULAR TO THE DIRECTION OF TRAFFIC SHALL BE PLACED IN ANY POSITION ALONG THE BRIDGE FOR CONTINUOUS BRIDGES, TO PRODUCE THE MAXIMUM NEGATIVE BENDING MOMENT.

2.3 DYNAMIC LOAD ALLOWANCE (IMPACT)

TO PROVIDE THE DYNAMIC STRENGTH AND VIBRATION INFLUENCE, STRESSES PRODUCED BY THE LOADING SHALL BE MULTIPLIED BY A DYNAMIC LOAD ALLOWANCE (IMPACT) COEFFICIENT. THIS IMPACT COEFFICIENT IS ONLY TO THE KNIFE EDGE LOAD (KEL). UNIFORM LOAD "D" LOADING ARE NOT APPLIED FOR IMPACT.

2.4 EARTHQUAKE FORCE

EARTHQUAKE FORCE WAS APPLIED IN ACCORDANCE WITH "PEMBEBANAN UNTUK JEMBATAN, RSNI 4 (LOADING FOR BRIDGES); STANDAR PERENCANAAN KETAHANAN GEMPA UNTUK JEMBATAN, SNI (DESIGN STANDARD OF EARTHQUAKE RESISTANCE FOR BRIDGES"

THE PEAK GROUND ACCELERATION OF BEDROCK AT EACH OF THE PROJECT FLYOVER SITES, OBTAIN FROM MAP OF SEISMIC ZONES FOR INDONESIA WITH A 500 YEAR RETURN PERIOD, IS PRESENTED IN TABLE BELOW :

SEISMIC ZONE AND PEAK GROUND ACCELERATION

NAME OF FLYOVER	SEISMIC ZONE	PEAK GROUND ACCELERATION
MERAK	2	0.46 - 0.50
BALARAJA	3	0.36 - 0.40
NAGREG	3	0.36 - 0.40
GEBANG	3	0.36 - 0.40
PETERONGAN	4	0.26 - 0.30
TANGGULANGIN	4	0.26 - 0.30

SEISMIC PERFORMANCE CATEGORY D FOR ALL FLYOVER.

2.5 THERMAL FORCES

THE AMBIENT TEMPERATURE ASSUMED FOR DESIGN IS 28°C. TEMPERATURE VARIATION IS 15°C - 45°C FOR STEEL STRUCTURE AND 15°C - 40°C FOR CONCRETE STRUCTURE.

MATERIALS FOR STRUCTURES

1. CONCRETE

THE USE OF EACH CLASS OF CONCRETE SHALL BE USE FOLLOWS UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR DIRECTED BY THE ENGINEER.

DESIGN STRENGTH OF CONCRETE IS SPECIFIED AS FOLLOWS :

CONCRETE CLASS	CHARACTERISTIC COMPRESSIVE STRENGTH (MPa)	APPLICATION OF STRUCTURE
A - 1	40	PRE-CAST PRE-STRESSED CONCRETE STRUCTURE
A -2	35	CAST-IN-SITU PRE-STRESSED CONCRETE STRUCTURE
B - 1	30	DECK SLAB, PIER HEADS AND COLUMNS, DIAPHRAGMS OF P.C.I-GIRDER, ABUTMENT, FOOTING CONCRETE BARRIER
B - 2	30	CAST-IN-SITU REINFORCED CONCRETE PILES, BORED PILES
C	20	RETAINING WALL
D	15	GRAVITY TYPE RETAINING WALLS
E	8	LEVELING CONCRETE

2. REINFORCING STEEL

2.1 TYPE, DESIGNATION AND MINIMUM YIELD STRENGTH OF REINFORCING STEEL FOR CONCRETE STRUCTURE ARE SPECIFIED AS FOLLOWS :

TYPE	GRADE	YIELD POINT (N/mm²)	APPLICATION STANDARD		
			SII	JIS	BS
ROUND BARS	SR 24	240	SII 0136	G 3112	BS 4449
DEFORMED BARS	SD 40	390	SII	G 3112	BS 4449

2.2 REINFORCING STEEL SHALL BE FREE OF MILL SCALES, OIL OR ANY SUBSTANCES WHICH WILL WEAKEN THE BOND WITH CONCRETE.

3. STRUCTURAL STEEL

TYPE, DESIGNATION AND MINIMUM YIELD POINT AND TENSILE STRENGTH OF STRUCTURAL STEEL AS FOLLOWS :

JIS STANDARD			APPLICATION STANDARD		
DESIGNATION	YIELD POINT (N/mm²)	TENSILE STRENGTH (N/mm²)	DESIGNATION	YIELD POINT (N/mm²)	TENSILE STRENGTH (N/mm²)
G 3101					
SS 400	215 - 245	400 - 510	A 36	250	400 - 500
G 3106					
SM 400	215 - 245	400 - 510	A 242	290 - 340	≥ 430
SM 490	295 - 325	490 - 610	A 440	290 - 340	430 - 480
SM 490 Y	325 - 365	490 - 610	A 441	290 - 340	430 - 480
SM 520	325 - 365	520 - 640	A 588	290 - 340	430 - 480
SM 570	420 - 460	570 - 720	A 572	410 - 450	510 - 550
G 3114					
SMA 400W	215 - 245	400 - 540			
SMA 490W	325 - 365	490 - 610			
SMA 570W	420 - 460	570 - 720	A 514	620 - 690	690 - 900

G 3101 : ROLLED STEEL OF GENERAL STRUCTURE
JIS G 3106 : ROLLED STEEL FOR WELDED STRUCTURE
JIS G 3114 : HOT-ROLLED ATMOSPHERIC CORROSION RESISTING

4. PRESTRESSING TENDON

TYPE, DESIGNATION AND MINIMUM YIELD POINT AND TENSILE STRENGTH OF PRESTRESSING TENDON ARE SPECIFIED AS FOLLOWS :

NOTATION	UTILIZATION	NOMINAL DIAMETER (mm)	YIELD STRENGTH (Kg/mm²)	BRAKING STRENGTH (Kg/mm²	APLICATION STANDARD	
					JIS	ASTM
PC WIRE SWPR 1A	PC PILE	Ø 7	135	155	G 3536	A 421
PC 7 WIRE STRAND SWPR 7B	PC HOLLOW CORE SLAB UNIT AND PC DOUBLE TRAPEZOID GIRDER, PC I-GIRDER	T 12.7	160	190	G3536	A 416
PC 19 WIRE STRAND SWPR 19	TRANSVERSAL CABLE FOR DECK SLAB AND DIAPHRAGM OF PC STRUCTURE	T 21.8	160	190	G 3536	A 416
PC BAR		Ø 32				

GENERAL NOTES FOR STRUCTURES (2)

CONSTRUCTION

1. SETTING OUT

THE SETTING OUT AND ELEVATIONS OF THE DIFFERENT COMPONENTS OF THE STRUCTURE SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE START OF ANY CONSTRUCTION WORK.

2. REINFORCED CONCRETE

2.1 CODES AND STANDARDS

1) DESIGN OF CONCRETE MIX SHALL MEET THE DESIGN CONCRETE STRENGTH GIVEN UNDER ITEM 1 OF MATERIALS.
2) CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH THE SPECIFICATIONS.
3) FOR CONCRETE DEPOSITED AGAINST THE GROUND. BLINDING CONCRETE WITH A MINIMUM THICKNESS OF 100MM SHALL BE LAID FIRST BEFORE INSTALLING THE REINFORCEMENT. THIS BLINDING CONCRETE SHALL NOT BE CONSIDERED IN MEASURING THE STRUCTURAL DEPTH OF CONCRETE SECTION.
4) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL IN PLACING SEQUENCES FOR ALL CONCRETING WORKS.

2.2 REINFORCEMENT DETAILS

1) THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL DETAILED SHOP DRAWINGS INDICATING THE BONDING, CUTTING, SPLICING AND INSTALLATION OF ALL REINFORCING BARS.
2) BARS SHALL BE BENT, COLD BARS PARTIALLY EMBEDDED IN CONCRETE SHALL NOT BE FIELD BENT UNLESS PERMITTED BY THE ENGINEER.
3) COVERING THICKNESS FOR REINFORCING BARS.

(1) MINIMUM THICKNESS OF CONCRETE COVERING FOR REINFORCING STEEL BARS SHALL CONFORM TO THE TABLE BELOW COVERING THICKNESS SHALL CONFORM TO THE DESIGN DRAWINGS.

IF THE THICKNESS IS NOT INDICATED IN THE DESIGN DRAWINGS, IT SHALL BE DETERMINED IN ACCORDANCE WITH TABLE BELOW AND APPROVED BY THE ENGINEER.

MINIMUM CONCRETE COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS :

FOR BALARAJA, NAGREG, PETERONGAN AND TANGGULANGIN FLYOVER

SURFACE IN CONTRACT WITH SOIL OR WATER	75 mm
COLUMNS	40 mm
GIRDER AND BEAM CAST-IN-SITU	35 mm
GIRDER AND BEAM PRECAST IN FACTORY	25 mm
SLABS, PARAPETS, ETC	30 mm

FOR MERAK AND GEBANG FLYOVER AT THE COASTAL AREA

SURFACE IN CONTRACT WITH SOIL OR WATER	75 mm
COLUMNS	55 mm
GIRDER AND BEAM CAST-IN-SITU	35 mm
GIRDER AND BEAM PRECAST IN FACTORY	25 mm
SLABS, PARAPETS, ETC	30 mm

(2) 1.5 TIMES THE MAXIMUM NOMINAL SIZE OF THE AGGREGATE.

(3) THE COVER IS NOT LESS THAN THE DIAMETER OF REINFORCING BARS.

4) DEVELOPMENT OF REINFORCEMENT

BASIC DEVELOPMENT FOR REBAR

DEVELOPMENT LENGTH/SPLICE LENGTH (mm)	BAR DIAMETER db					
	10	13	16	19	25	32
BASIC DEVELOPMENT LENGTH IN TENSION	300	312	384	456	717	1174
BASIC DEVELOPMENT LENGTH IN TENSION - PLASTIC HINGE	375	390	480	570	896	1468
BASIC DEVELOPMENT LENGTH IN COMPRESSION	200	229	282	334	440	563
BASIC HOOK DEVELOPMENT LENGTH	183	237	292	347	456	584
BASIC HOOK DEVELOPMENT LENGTH - PLASTIC HINGE	228	297	365	434	571	730

5) SPLICES OF REINFORCEMENT

(1) WHEN PROVIDING SPLICES AT A LOCATION WHEN IT IS NOT INDICATED ON THE DRAWINGS, SUCH A LOCATION MUST BE APPROVED BY THE ENGINEER.

(2) LAP SPLICES SHALL BE PERMITTED ONLY WITHIN THE CENTER HALF OF COLUMN HEIGHT.

(3) LAP SPLICES LENGTH SHALL NOT BE LESS THAN 400MM OR 60 BAR DIAMETER, WHICHEVER IS GREATER.

(4) INDIVIDUAL BAR SPLICES WITHIN A BUNDLES SHALL NOT OVERLAP. ENTIRE BUNDLES SHALL NOT BE LAP SPLICED.

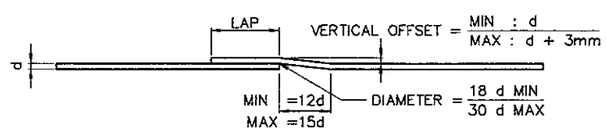
(5) THE MAXIMUM SPACING OF THE TRANSVERSE REINFORCEMENT OVER THE LENGTH OF THE SPLICE SHALL NOT EXCEED THE SMALLER ONE QUARTER OF THE MINIMUM MEMBER DIMENSION OR 100MM.

(6) FULL WELDED OR FULL MECHANICAL SPLICES MAY BE USED PROVIDED THAT NOT MORE THAN ALTERNATE BARS IN EACH LAYER OF LONGITUDINAL REINFORCEMENT ARE SPLICED AT A SECTION AND THE DISTANCE BETWEEN SPLICES OF ADJACENT BARS SHALL BE GREATER THAN 600MM.

(7) WELDING FOR WELDED SPLICES SHALL CONFORM TO THE CURRENT EDITION OF STRUCTURAL WELDING CODE - REINFORCING STEEL OF AWS (D1.4).

A FULL -WELDED SPLICES SHALL BE REQUIRED TO DEVELOP IN TENSION, AT LEAST 125% OF THE SPECIFIED YIELD STRENGTH OF THE BAR.

5) CRANKED SPLICES



7) HOOKS AND BENDS

STANDARD HOOKS FOR LONGITUDINAL REINFORCEMENT SHALL BE AS FOLLOWS :

- 180° BEND PLUS A 4.0 db EXTENSION BUT NOT LESS THAN 65MM AT FREE END OF THE BAR.
- 90° BEND PLUS A 12.0 db EXTENSION AT THE FREE END OF THE BAR.

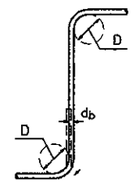
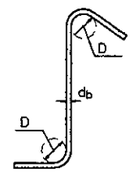
STANDARD HOOKS FOR TRANSVERSE REINFORCEMENT SHALL BE AS FOLLOWS :

- 16MM DIAMETER BARS AND SMALLER - 90° BEND PLUS A 6.0 db EXTENSION AT THE FREE END OF THE BAR.
- 19 TO 25MM DIAMETER BAR - 90° BEND PLUS A 12.0 db EXTENSION AT THE FREE END OF THE BAR.
- 25MM BAR AND GREATHER -135° BEND PLUS A 6.0 db EXTENSION AT THE FREE END OF THE BAR.

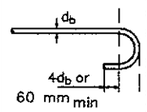
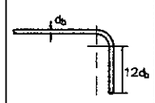
SEISMIC HOOKS

SEISMIC HOOKS SHALL CONSIST OF 135° BEND PLUS A 6.0 db EXTENSION, BUT NOT LESS THAN 75MM AT THE FREE END OF THE BAR.

STANDARD HOOK FOR TRANSVERSE REINFORCEMENT

BENDING ANGLE OF BARS	FIGURE	DIAMETER OF BARS	DIAMETER OF BEND OF BARS OUT TO OUT	STRAIGHT EXTENSION LENGTH	REMARKS
90°		D10 TO D16 GENERAL	6 db	6 db	
		D10 TO D16 STIRRUP AND TIES	4 db	6 db	
		D32	6 db	12 db	
135°		D10 TO D25	8 db	6 db	

STANDARD HOOK IN TENSION

BENDING ANGLE OF BARS	FIGURE	DIAMETER OF BARS	DIAMETER OF BEND OF BARS OUT TO OUT	STRAIGHT EXTENSION LENGTH	REMARKS
180°		D10 - D25	8 db	4 db OR 60 mm min	
		D29, D32, D36	10 db		
		D43, D57	12 db		
90°		D10 - D25	8 db	12 db	
		D29, D32, D36	10 db		
		D43, D57	12 db		

8) TIES

IN TIED COMPRESSION MEMBERS, ALL LONGITUDINAL BARS SHALL BE ENCLOSED BY LATERAL TIES THAT SHALL BE EQUIVALENT TO 10MM BARS FOR 32MM DIAMETER BARS OR SMALLER.

THE SPACING AT TIES SHALL NOT EXCEED THE LEAST DIMENSION OF THE MEMBER OR 300MM.

TIES SHALL BE LOCATED VERTICALLY NOT MORE THAN HALF A TIE SPACING ABOVE THE FOOTING AND NOT MORE THAN HALF A TIE SPACING BELOW THE LOWEST HORIZONTAL REINFORCEMENT IN THE SUPPORT MEMBER.

9) REBAR DESCRIPTION

BAR MARK	NO.	BAR DIAMETER	SPACING	NOTE

FOR COLUMNS REFERENCES TO BAR SPACING IS NOT GIVEN. BAR SHALL BE PLACED TO GIVE EQUAL SPACING IN COLUMNS UNLESS NOTED OTHERWISE.

GENERAL NOTES FOR STRUCTURES (3)

10) PLACEMENT AND INSPECTION

(1) MAINTAIN PROPER SPACING BETWEEN BARS, USING SPACERS, HANGERS OF BAR SUPPORT.

(2) UNLESS OTHERWISE SHOWN ON THE PLANS, THE CLEAR DISTANCE BETWEEN PARALLEL BARS IN A LAYER SHALL NOT BE LESS THAN 1.5 TIMES THE NOMINAL BAR DIAMETER OF THE BAR NOR LESS THAN 1.5 TIMES THE MAXIMUM SIZE OF COARSE AGGREGATE.

FOR MULTILAYER, THE CLEAR DISTANCE BETWEEN LAYERS SHALL NOT BE LESS THAN 25MM OR THE NOMINAL DIAMETER. THE BARS IN THE UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER.

11) CONSTRUCTION JOINT

(1) THE POSITION AND FORM OF ANY CONSTRUCTION JOINT SHALL BE AS SHOWN ON DRAWINGS OR AS AGREED WITH THE ENGINEER.

(2) THE INTERFACE BETWEEN THE FIRST AND SECOND POUR CONCRETES SHALL BE ROUGHENED WITH AN AMPLITUDE OF 6MM MINIMUM.

12) FALSEWORK

(1) ALL FALSEWORK SHALL BE DESIGNED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ENGINEER.

(2) DETAILED WORKING DRAWINGS AND SUPPORTING CALCULATIONS OF THE FALSEWORK SHALL BE FURNISHED BY THE CONTRACTOR TO THE ENGINEER FOR HIS APPROVAL.

13) FORMWORK

(1) FORMWORK SHALL BE CONSTRUCTED SUCH THAT IT WILL NOT YIELD UNDER LOAD AND SHALL BE SUCH AS TO AVOID THE FORMATION OF FINS.

(2) UNLESS OTHERWISE SHOWN ON THE PLANS, ALL EXPOSED EDGES SHALL BE CHAMFERED 20MM EXCEPT RAILINGS AND RE - ENTRANT ANGLES WHICH SHALL BE CHAMFERED AND FILLETED 13MM.

(3) STRIPPING OF FORMS AND SHORINGS SHALL BE AS APPROVED BY THE ENGINEER. THE FOLLOWING MAY BE USED AS A GUIDE :

SHORING UNDER GIRDERS, BEAM, FRAMES	14 DAYS MIN. TIME
DECK SLABS	14 DAYS
WALLS	7 DAYS
COLUMNS	7 DAYS
SIDES OF BEAMS AND ALL OTHER VERTICAL SURFACES	2 DAYS

14) PROTECTION AND CURING OF CONCRETE

CONCRETE SURFACES SHALL BE PROTECTED FROM HARMFUL EFFECTS OF SUN, WIND AND RUNNING WATERS AND SHALL BE KEPT DAMP FOR AT LEAST 7 DAYS.

15) STRUCTURAL STEEL

(1) THE CONTRACTOR SHALL PREPARE AND SUBMIT SHOP DRAWINGS FOR ALL STRUCTURAL STEEL WORKS. THESE SHOP DRAWINGS SHALL BE APPROVED BY THE ENGINEER BEFORE ANY FABRICATION COMMENCES.

(2) CONSTRUCTION OF STRUCTURAL STEEL.

- WELDING REQUIREMENTS SHALL IN ALL RESPECT CONFORM TO THE GENERAL SPECIFICATIONS OF THIS PROJECT.

- THE DIAMETER OF BOLT HOLES SHALL BE 2.5MM LARGER THAN THE NOMINAL DIAMETER OF BOLT.

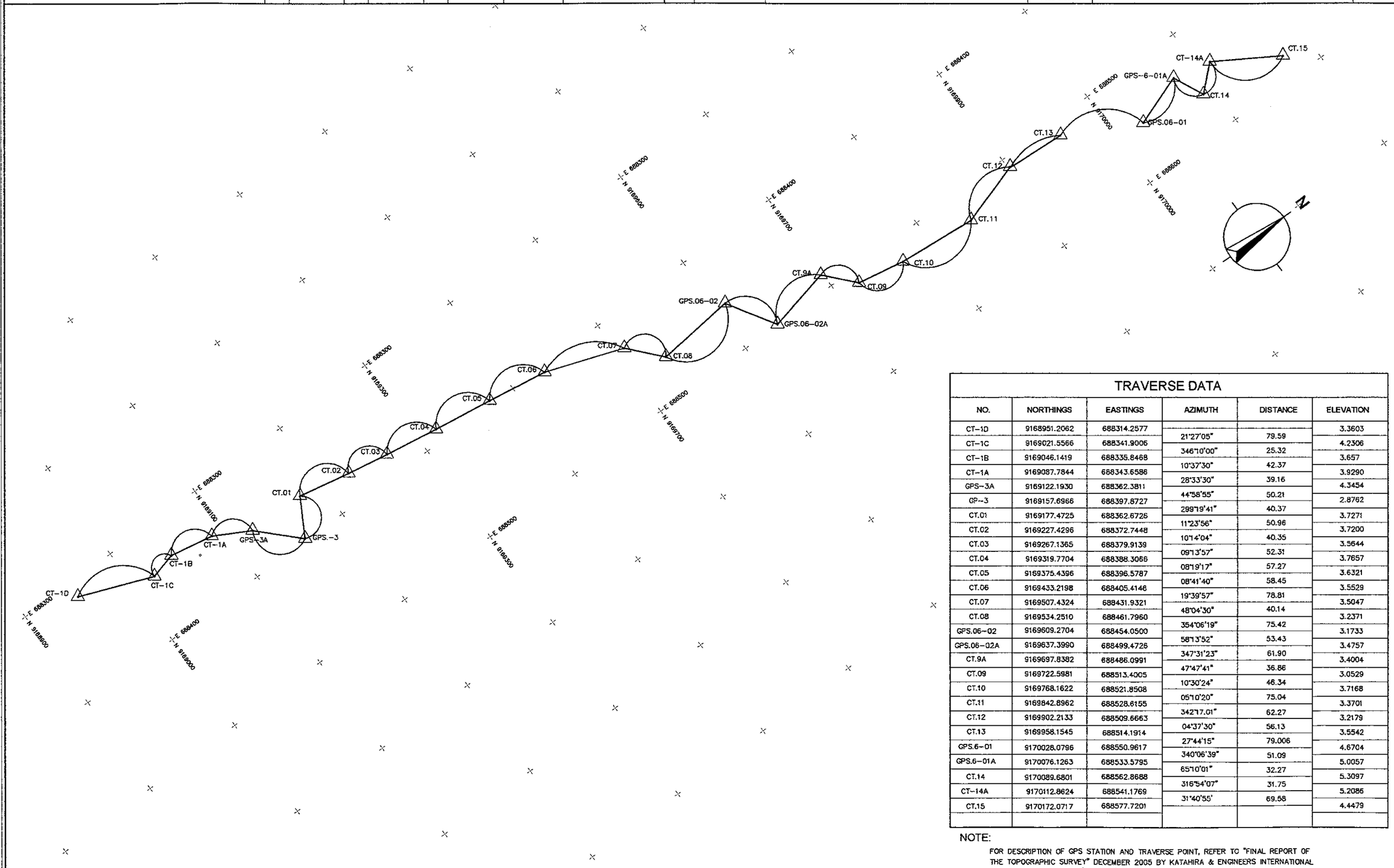
SYMBOL AND INFORMATION FOR STEEL STRUCTURE DRAWINGS
WELDING SYMBOL

SQUARE
FILLET
SINGLE V
DOUBLE V
BEVEL
WELD ALL AROUND
WELD ALL AROUND

16) QUANTITIES

THE QUANTITIES FOR BRIDGE AND STRUCTURES SHOWN ON THE DRAWINGS ARE APPROXIMATELY AND FOR REFERENCE PURPOSES ONLY. ANY DISCREPANCY BETWEEN THESE ESTIMATED QUANTITIES AND THE FINALLY ACCEPTED QUANTITIES SHALL NOT BE A REASON FOR CLAIMS OR DISPUTE.

JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name: R. UENO	Name: T. OKUMURA	Name: M. KIUCHI		DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	1 : 3500	TOPOGRAPHIC SURVEY CONTROL NETWORK GPS, TRAVERSE, BM	TGE-013
	Sign	Sign	Sign	APPROVED BY: Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400				SHEET NO :
	Date	Date	Date	Sign / Date		FULL SIZE A3		13 / 19



TRAVERSE DATA

NO.	NORTHINGS	EASTINGS	AZIMUTH	DISTANCE	ELEVATION
CT-1D	9168951.2062	688314.2577			3.3603
			21°27'05"	79.59	
CT-1C	9169021.5566	688341.9006			4.2306
			346°10'00"	25.32	
CT-1B	9169046.1419	688335.8468			3.657
			10°37'30"	42.37	
CT-1A	9169087.7844	688343.6586			3.9290
			28°33'30"	39.16	
GPS-3A	9169122.1930	688362.3811			4.3454
			44°58'55"	50.21	
GP-3	9169157.6966	688397.8727			2.8762
			299°19'41"	40.37	
CT.01	9169177.4725	688362.6726			3.7271
			11°23'56"	50.96	
CT.02	9169227.4296	688372.7448			3.7200
			10°14'04"	40.35	
CT.03	9169267.1365	688379.9139			3.5644
			09°13'57"	52.31	
CT.04	9169319.7704	688388.3066			3.7657
			08°19'17"	57.27	
CT.05	9169375.4396	688396.5787			3.6321
			08°41'40"	58.45	
CT.06	9169433.2198	688405.4146			3.5529
			19°39'57"	78.81	
CT.07	9169507.4324	688431.9321			3.5047
			48°04'30"	40.14	
CT.08	9169534.2510	688461.7960			3.2371
			354°06'19"	75.42	
GPS.06-02	9169609.2704	688454.0500			3.1733
			58°13'52"	53.43	
GPS.06-02A	9169637.3990	688499.4726			3.4757
			347°31'23"	61.90	
CT.9A	9169697.8382	688486.0991			3.4004
			47°47'41"	36.86	
CT.09	9169722.5981	688513.4005			3.0529
			10°30'24"	46.34	
CT.10	9169768.1622	688521.8508			3.7168
			05°10'20"	75.04	
CT.11	9169842.8962	688528.6155			3.3701
			342°17.01"	62.27	
CT.12	9169902.2133	688509.6663			3.2179
			04°37'30"	56.13	
CT.13	9169958.1545	688514.1914			3.5542
			27°44'15"	79.006	
GPS.6-01	9170028.0796	688550.9617			4.6704
			340°06'39"	51.09	
GPS.6-01A	9170076.1263	688533.5795			5.0057
			65°10'01"	32.27	
CT.14	9170089.6801	688562.8688			5.3097
			316°54'07"	31.75	
CT-14A	9170112.8624	688541.1769			5.2086
			31°40'55'	69.58	
CT.15	9170172.0717	688577.7201			4.4479

NOTE:

FOR DESCRIPTION OF GPS STATION AND TRAVERSE POINT, REFER TO "FINAL REPORT OF THE TOPOGRAPHIC SURVEY" DECEMBER 2005 BY KATAHIRA & ENGINEERS INTERNATIONAL AND PT. VIRAMA KARYA (PERSERO)

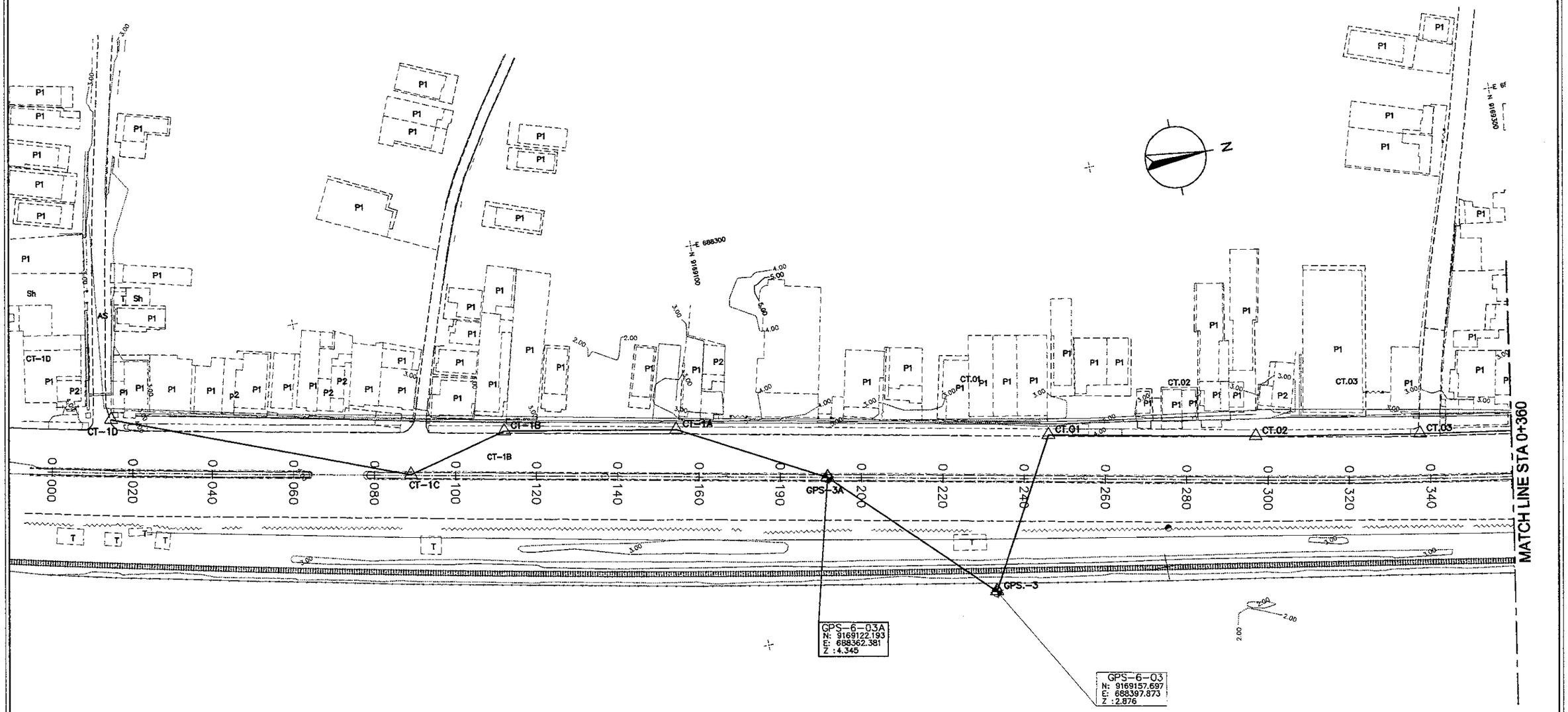
LEGEND :

- ⊙ : GPS
- △ : TRAVERSE
- ⊠ : BENCH MARK (BM)

1 / - TOPOGRAPHIC SURVEY CONTROL NETWORK GPS, TRAVERSE, BM

SCALE 1:3500

JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY		CHECKED BY		SUBMITTED BY		REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name	R. UENO	Name	T. OKUMURA	Name	M. KIUCHI		DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	1 : 1000	TOPOGRAPHIC PLAN (1 OF 4)	TGE-014
	Sign		Sign		Sign		APPROVED BY: Ir. HERRY VAZA M,Eng.Sc				SHEET NO :
	Date		Date		Date		NIP. : 110038400 / Sign / Date		FULL SIZE A3		14/ 19



LEGEND :

- P1 : PERMANENT BUILDING (1 FLOOR)
- P2 : PERMANENT BUILDING (2 FLOORS)
- P3 : PERMANENT BUILDING (3 FLOORS)
- SP : SEMI PERMANENT
- T : TEMPORARY
- SH : SHED (BANGSAL)
- ST : STALL (KIOS)
- ⊙ : GPS
- △ : TRAVERSE
- ⊠ : BENCH MARK (BM)

1 / - TOPOGRAPHIC PLAN
SCALE 1:1000

NOTE:

FOR DESCRIPTION OF GPS STATION AND TRAVERSE POINT, REFER TO "FINAL REPORT OF THE TOPOGRAPHIC SURVEY" DECEMBER 2005 BY KATAHIRA & ENGINEERS INTERNATIONAL AND PT. VIRAMA KARYA (PERSERO)

JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
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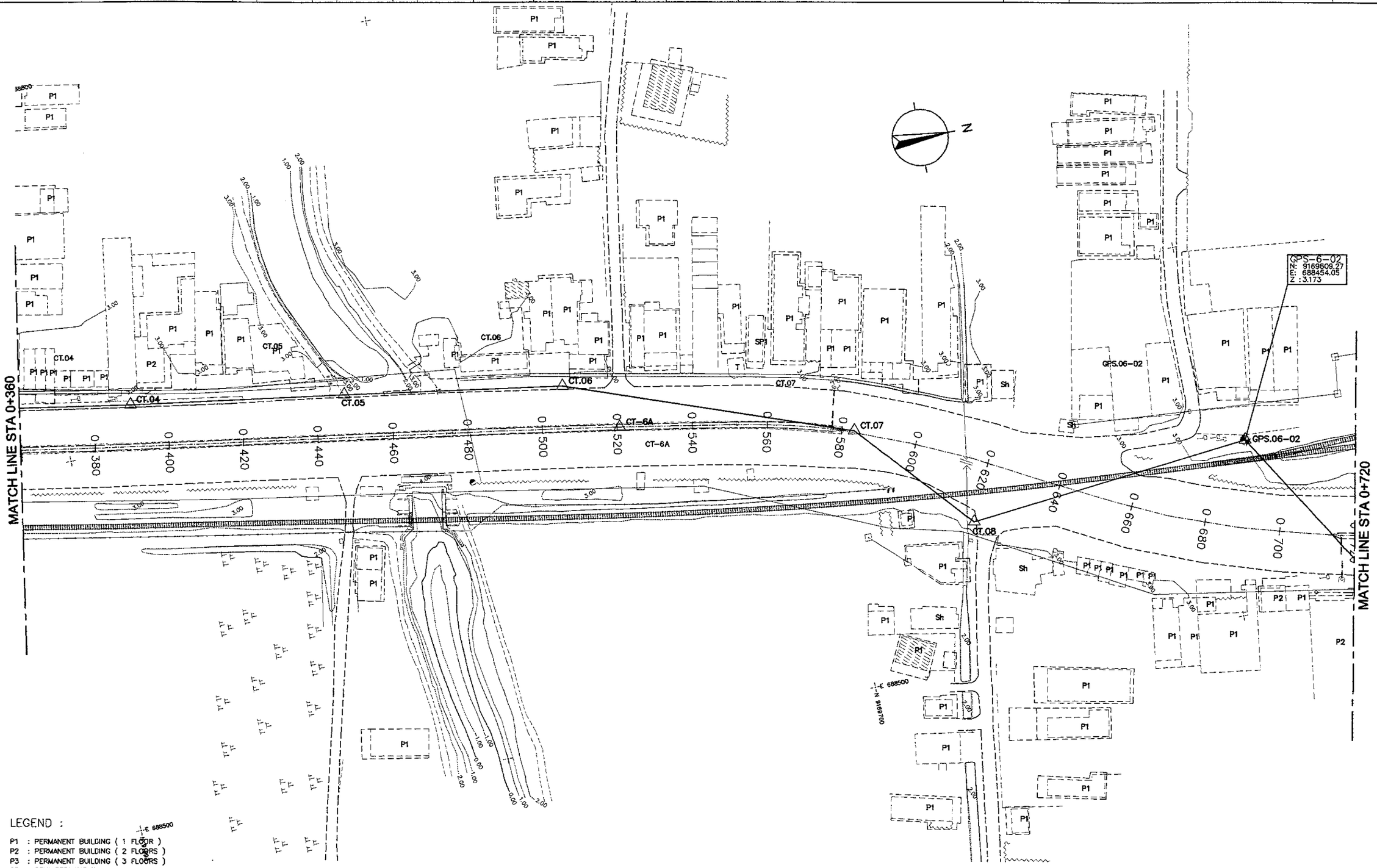
	Sign	Sign	Sign	APPROVED BY: Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400				SHEET NO :
	Date	Date	Date	Sign / Date		FULL SIZE A3		15 / 19



LEGEND :

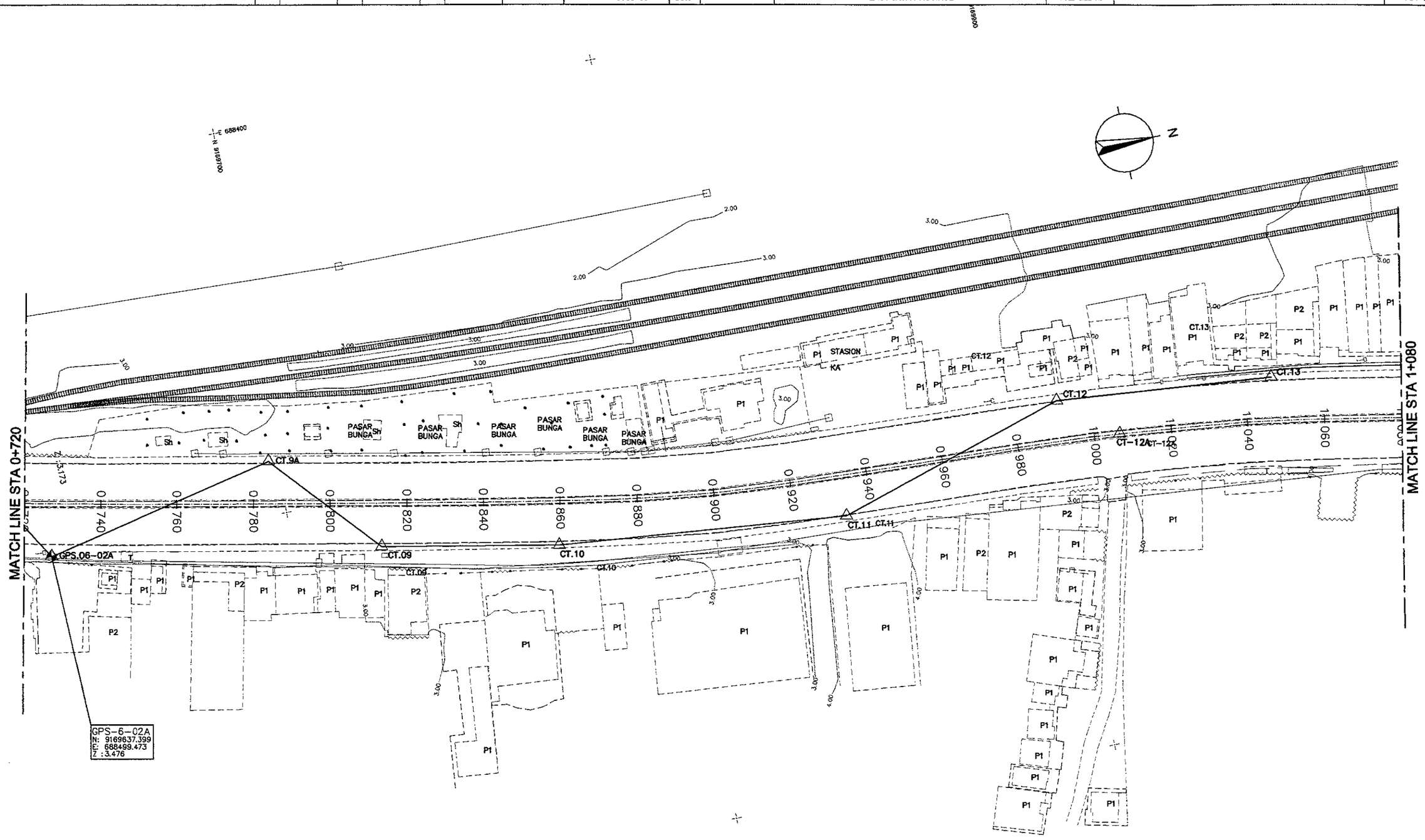
- P1 : PERMANENT BUILDING (1 FLOOR)
- P2 : PERMANENT BUILDING (2 FLOORS)
- P3 : PERMANENT BUILDING (3 FLOORS)
- SP : SEMI PERMANENT
- T : TEMPORARY
- SH : SHED (BANGSAL)
- ST : STALL (KIOS)
- ⊙ : GPS
- △ : TRAVERSE
- ⊠ : BENCH MARK (BM)

1 / - TOPOGRAPHIC PLAN
SCALE 1:1000

NOTE:

FOR DESCRIPTION OF GPS STATION AND TRAVERSE POINT, REFER TO "FINAL REPORT OF THE TOPOGRAPHIC SURVEY" DECEMBER 2005 BY KATAHIRA & ENGINEERS INTERNATIONAL AND PT. VIRAMA KARYA (PERSERO)

JICA JAPAN INTERNATIONAL COOPERATION AGENCY / KEI KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name R. UENO	Name T. OKUMURA	Name M. KIUCHI		DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	1 : 1000	TOPOGRAPHIC PLAN (3 OF 4)	TGE-016
	Sign	Sign	Sign	APPROVED BY Ir. HERRY VAZA M,Eng.Sc NIP. : 110038400 Sign				SHEET NO :
	Date	Date	Date	Date		FULL SIZE A3		16 / 19



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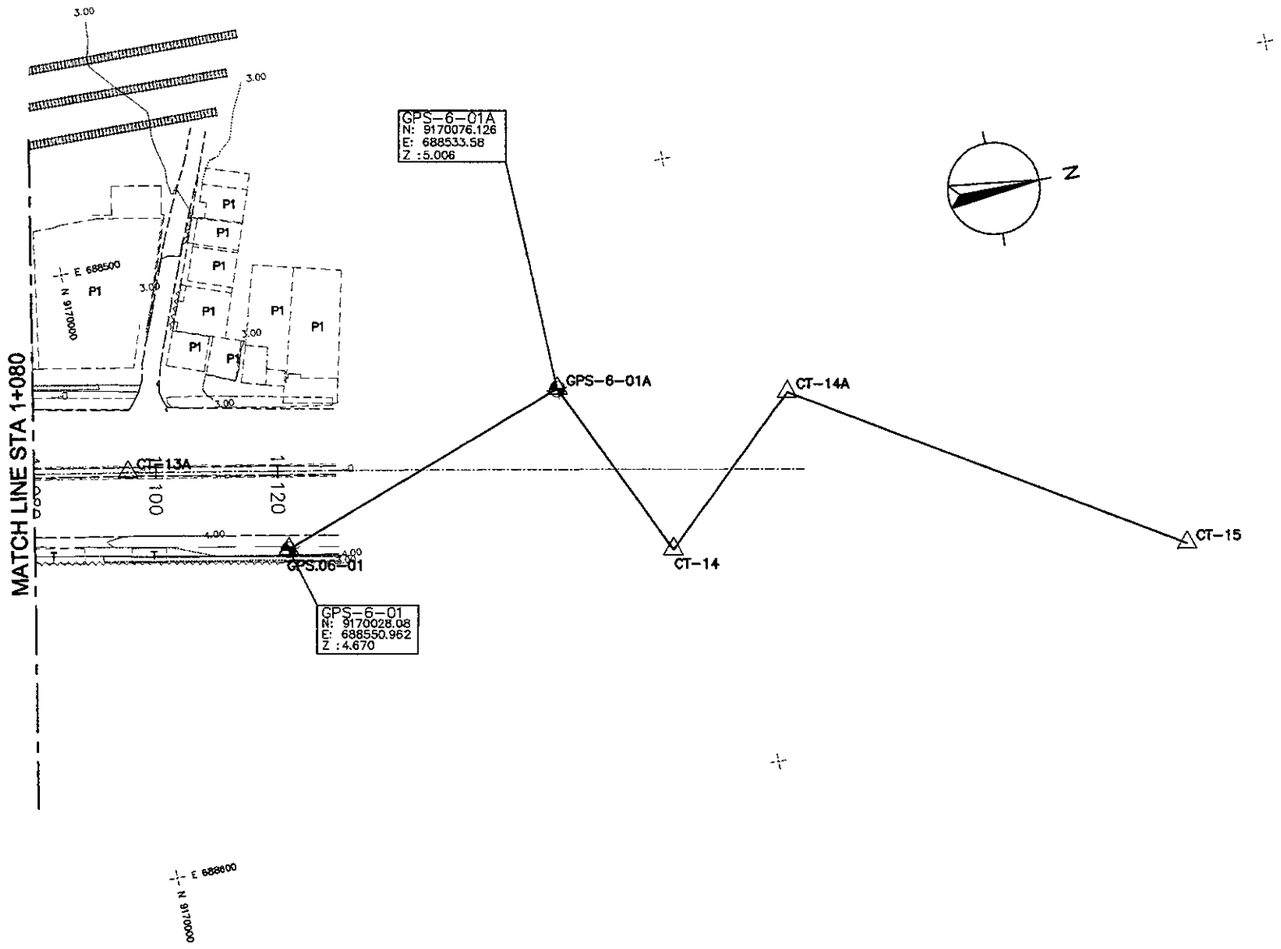
JAPAN INTERNATIONAL COOPERATION AGENCY KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY		CHECKED BY		SUBMITTED BY		REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS				PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
	Name	R. UENO	Name	T. OKUMURA	Name	M. KIUCHI					DETAILED DESIGN STUDY OF NORTH JAVA CORRIDOR FLYOVER PROJECT TANGGULANGIN FLYOVER - CONTRACT PACKAGE 3 (PETERONGAN -TANGGULANGIN) EAST JAVA PROVINCE	1 : 1000	TOPOGRAPHIC PLAN (4 OF 4)	TGE-017
	Sign		Sign		Sign		APPROVED BY	Ir. HERRY VAZA M,Eng.Sc	Sign					SHEET NO :
	Date		Date		Date			NIP. : 110038400	Date			FULL SIZE A3		17 / 19



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1 / - TOPOGRAPHIC PLAN
SCALE 1:1000

NOTE:

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JICA JAPAN INTERNATIONAL COOPERATION AGENCY / KEI KATAHIRA & ENGINEERS INTERNATIONAL	DESIGNED BY	CHECKED BY	SUBMITTED BY	REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS	PROJECT AND LOCATION :	SCALE :	DRAWING TITLE :	DRAWING NO :
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	Sign	Sign	Sign	APPROVED BY Ir. HERRY VAZA M.Eng.Sc NIP. : 110038400 Sign				SHEET NO :
	Date	Date	Date	Date		FULL SIZE A3		18 / 19

No. PAY ITEMS	DESCRIPTION	UNIT	TOTAL QUANTITY	REMARKS
	DIVISION 1 - GENERAL			
1.2	Mobilization and Demobilization	LS	1.00	
1.2(1)b	Engineer Facilities	LS	1.00	
1.8	Maintenance and Protection of Traffic	LS	1.00	
	DIVISION 2 - DRAINAGE			
2.1(1)	Common Excavation for drainage ditches and waterways	Cu.M	150.00	
2.2(1)	Mortared Stonework for drainage channel	Cu.M	21.10	
2.3(1)	Reinforced Concrete Pipe Culvert Inn.Dim. 40 cm Type A	Lin.M	0.00	
2.3(2)	Reinforced Concrete Pipe Culvert Inn.Dim. 40 cm Type B	Lin.M		
2.3(3)	Reinforced Concrete Pipe Culvert Inn.Dim. 60 cm Type A	Lin.M	0.00	
2.3(4)	Reinforced Concrete Pipe Culvert Inn.Dim. 60 cm Type B	Lin.M	51.90	
2.3(5)	Reinforced Concrete Pipe Culvert Inn.Dim. 80 cm Type A	Lin.M	244.90	
2.3(6)	Reinforced Concrete Pipe Culvert Inn.Dim. 80 cm Type B	Lin.M	0.00	
2.3(7)	Reinforced Concrete Pipe Culvert Inn.Dim. 100 cm Type A	Lin.M		
2.3(8)	Reinforced Concrete Pipe Culvert Inn.Dim. 100 cm Type B	Lin.M		
2.9(9)a	Manhole Type I	Each	84.00	
2.9(9)b	Manhole Type II	Each	2.00	
2.9(9)c	Manhole Type III	Each	11.00	
2.9(9)d	Manhole Type IV	Each	0.00	
2.9(9)e	Manhole Type V	Each	5.00	
2.9(9)f	Manhole Type VI	Each	3.00	
2.9(9)g	Manhole Type VII	Each	8.00	
2.9(9)h	Manhole Type VIII	Each	4.00	
2.9(9)i	Manhole Type IX	Each		
2.9(9)j	Manhole Type X	Each		
2.9(10)	Catch Basin Type I	Each	8.00	
2.3(12)a	U - Ditch, DS - 1	Each	80.50	
2.3(12)b	U - Ditch, DS - 2	Ln.M	0.00	
2.3(12)c	U - Ditch, DS - 3	Ln.M	0.00	
2.3(12)d	U - Ditch, DS - 3 A	Ln.M		
2.3(12)e	U - Ditch, DS - 4	Ln.M	1359.00	
2.3(12)f	U - Ditch, DS - 4 A	Ln.M		
2.3(12)g	U - Ditch, DS - 5	Ln.M	340.00	
2.3(13)	Drain Pipe Dia 150 mm	Ln.M		
2.3(14)	Drain Pipe Dia 200 mm	Ln.M	125.82	
2.3(15)	Drain Pipe Dia 250 mm	Ln.M	260.50	
2.3(16)	Deck Drain Type I	Each		
2.3(17)	Deck Drain Type II	Each	35.00	
2.3(18)	Steel Gutter drain screen	Ln.M		
2.3(19)	Outer Ditch Elevated	Ln.M	75.00	
2.3(20)	Extension of Existing Box Culvert	Ln.M	1.80	
	DIVISION 3 - EARTHWORKS			
3.1(1)	Clearing and Grubbing	Sq.M	8203.85	
3.1(2)	Selected Tree Removal Diameter Ø200 mm Ø300 mm	Each	62.00	
3.1(3)	Selected Tree Removal Diameter > 300 mm	Each	19.00	
3.2(1)	Common Excavation	Cu. M	3939.42	
3.2(2)	Excavation of Existing Pavement	Cu. M	513.17	
3.2(3)	Structure Excavation to a depth not exceeding 2 m	Cu. M	570.62	
3.2(4)	Structure Excavation to a depth greater than 2 m but not exceeding 4 m	Cu. M	89.23	
3.2(5)	Structure Excavation to a depth greater than 4 m	Cu. M		
3.2(7)	Rock Excavation	Cu. M		
3.3(1)	Borrow materials and common backfill	Cu. M	1081.57	
3.3(2)	Structural Backfill	Cu. M	280.81	
3.3(3)	Permeable Backfill	Cu. M	61.96	
SS 3.3	Soil Cement Improvement	Cu. M	2172.21	
3.3(4)	Lighweight Embankment	Cu. M	8299.35	
3.3(6)	Intermediate Concrete Slab	Sq.M	7067.70	
3.4(1)	Sub Grade Preparation	Sq.M	9901.36	
SS 3.4 (1)	Mechanical Stabilized Earthwall and Accessories	Sq.M	0.00	
SS 3.4 (2)	Retaining Wall for Lighweight Embankment	Sq.M	1327.90	

No. PAY ITEMS	DESCRIPTION	UNIT	TOTAL QUANTITY	REMARKS
	DIVISION 4 - PAVEMENT WIDENING AND SHOULDERS			
4.2.(1)	Aggregate Sub Base Class B	Cu. M	116.27	
	DIVISION . 5 GRANULAR PAVEMENT			
5.1.(1)	Aggregate Sub Base Class A	Cu. M	2456.36	
5.1.(2)	Aggregate Sub Base Class B	Cu. M	3137.92	
	DIVISION . 6 ASPHALT PAVEMENT			
6.1.(1)	Prime Coat	Litre	8402.87	
6.1.(2)	Tack Coat	Litre	16305.80	
6.3.(1)	Asphalt Concrete Wearing Course (AC-WC)	Ton	2237.87	
6.3.(2)	Asphalt Concrete Binder Course (AC-BC)	Ton	1344.40	
6.3.(3)	Asphalt Concrete Base (AC-Base)	Ton	1862.38	
	DIVISION 7 - STRUCTURE			
7.1.(1)a	Structure Concrete, Class A - (Fc' = 35 Mpa) for Post Tension Double Girder	Cu m	684.73	
7.1.(1)b	Structure Concrete, Class A - (Fc' = 35 Mpa) for Steel Girder	Cu m	465.00	
7.1.(2)a	Structure Concrete, Class B - (Fc' = 30 Mpa) for Pier Head	Cu m	99.18	
7.1.(2)b	Structure Concrete, Class B - (Fc' = 30 Mpa) for Coulumn	Cu m	57.34	
7.1.(2)c	Structure Concrete, Class B - (Fc' = 30 Mpa) for Composite Coulumn	Cu m	105.31	
7.1.(2)d	Structure Concrete, Class B - (Fc' = 30 Mpa) for Abutment	Cu m	194.12	
7.1.(3)a	Structure Concrete, Class B-1 (Fc' = 28 Mpa) for Barrier, Median	Cu m		
7.1.(3)b	Structure Concrete, Class B-1 (Fc' = 28 Mpa) for Parapet, Wall	Cu m	683.87	
7.1.(5)	Structure Concrete, Class C (Fc' = 24 Mpa) for Footing, Approach Slab, Retaining Wall	Cu m	257.66	
7.1.(6)	Structure Concrete, Class D (Fc' = 20 Mpa)	Cu m		
7.1.(8)	Structure Concrete, Class E (Fc' = 17 Mpa)	Cu m	39.74	
SS 7.1.(9)	Waterproofing on Deck	SqM	2300.00	
SS 7.1.(10)	Structure Casing for Bored Pile (Ribber Inner Surface t = 13 mm)	Kg	28825.20	
SS 7.1.(11)	Structure Casing for Bored Pile (Erected)	Kg	28825.20	
7.2.(9)	PC Strand Size 12.7 mm	Kg	14205.00	
7.2.(9)a	PC Strand Size 21.8 mm	Kg	9905.12	
7.3.(3)	PC Bar	Kg	798.00	
7.3.(4)	Reinforcing Steel Bars Grade 40	Kg	354494.64	
7.5.(1)	Furnish and Delivery of Steel Girder	Ton	214.00	
7.5(1)a	Furnish and Delivery of Steel Coping and Portal	Ton	181.19	
7.5.(3)	Erection of Steel Girder	Ton	214.00	
7.5.(4)	Erection of Steel Coping and Portal	Ton	181.19	
7.6.(22)	Cast in Place Concrete Bored Pile Dia 1500 mm	Ln. M	384.00	
7.6.(23)	Cast in Place Concrete Bored Pile Dia 1800 mm	Ln. M	234.00	
7.6.(26)	Cast in Place Concrete Bored Pile Dia 2500 mm	Ln. M	287.00	
7.6.(27)	Pile Integrity Test	Each	20.00	
SS 7.6.(28)	Pile Dynamic Analysis (PDA) Dia 1500 mm	Each	1.00	
SS 7.6.(29)a	Pile Dynamic Analysis (PDA) Dia 1800 mm	Each	1.00	
SS 7.6.(29)b	Pile Dynamic Analysis (PDA) Dia 2500 mm	Each	1.00	
7.9.(1)	Stone masonry	Cu. M	78.64	
7.9 (2)	Blinding Stone	Cu. M		
7.11.(2)	Expansion Joint (Type A)	Ln. M	46.00	
7.11.(3)	Expansion Joint (Type B)	Ln. M		
SS 7.11.(4)	Restrainer Type - A	Set	2.00	
SS 7.11.(5)	Restrainer Type - B	Set	2.00	
SS 7.11.(6)	Stopper for Steel Girder	Set	4.00	
7.12.(2)	Elastomeric Bearing Pad Type - A1	Set		
7.12.(2)a	Elastomeric Bearing Pad Type - A2	Set		
7.12.(2)b	Elastomeric Bearing Pad Type - A3	Set	4.00	
7.12.(2)c	Elastomeric Bearing Pad Type - A4	Set	0.00	
7.12.(2)a	Bridge Bearing for Steel Girder, Type - B1	Set	4.00	
7.12.(2)b	Bridge Bearing for Steel Girder, Type - B2	Set	0.00	
7.12.(2)c	Bridge Bearing for Steel Girder, Type - C1	Set	1.00	
7.12.(2)d	Bridge Bearing for Steel Girder, Type - C2	Set	1.00	
7.12.(2)e	Bridge Bearing for Steel Girder, Type - C3	Set	2.00	
7.12.(2)f	Bridge Bearing for Steel Girder, Type - C4	Set	0.00	

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	Sign	Sign	Sign	APPROVED BY Ir. HERRY VAZA M.Eng.Sc				SHEET NO :
	Date	Date	Date	NIP. : 110038400 Sign / Date		FULL SIZE A3		19 / 19

No. PAY ITEMS	DESCRIPTION	UNIT	TOTAL QUANTITY	REMARKS
7.13	Steel Bridge Railings	Ln. M	1061.00	
7.14	Bridge Name Plate	Each	2.00	
7.15.(1)	Demolition of Existing Structure Masonry	Cu m	203.96	
7.15.(2)	Demolition of Existing Structure Concrete	Cu m	161.61	
7.15.(10)	Demolition of Existing Rigid Pavement	Sq. M		
7.15.(11)	Demolition of Existing Hedge of Fence	Ln. M	317.87	
7.15.(12)	Demolition of Existing Concrete Side Walk	Sq. M	0.00	
7.15.(13)	Demolition of Existing Concrete Curb	Ln. M	0.00	
7.16.(2)	Rigid Pavement (t = 270 mm)	Sq. M		
7.17.(1)	Lean Concrete for Rigid Pavement (t = 100 mm)	Sq. M		
	DIVISION 8 - MISCELLANEOUS			
8.1.(1)	Solid Sodding	Sq. M	1387.10	
8.3.(1)	Vehicle Guardrail Type - A	Ln. M		
8.3.(13)	BRC Fence	Ln. M	0.00	
8.3.(15)	Guard Fence Over Railway	Ln. M		
8.4.(1)	Regulatory and Warning Sign,Type A	Each	30.00	
8.4.(2)	Regulatory and Warning Sign,Type B	Each	2.00	
8.5.(17)	Overhead Sign, Type A	Each	0.00	
8.5.(18)	Overhead Sign, Type B	Each	2.00	
8.5.(19)	Overhead Sign, Type C	Each		
8.6.(6)	Reflective Thermoplastic Pavement Marking	Sq. M	675.96	
8.8.(1)	Precast Concrete Curb Type A	Ln M	1793.71	
8.8.(2)	Precast Concrete Curb Type B	Ln M	1841.51	
8.8.(3)	Concrete Median Type A	Ln M	0.00	
8.8.(4)	Concrete Median Type B	Ln M	530.00	
8.8.(5)	Concrete Sidewalk	Sq. M	925.86	
	DIVISION 9 - UTILITIES			
9.1.1	Street Lighting Pole, Type A (11 m)	Each	76.00	
9.1.2	Street Lighting Ceiling, Type A - Sont 150 watt	Each	18.00	
9.1.3	Street Lighting Ceiling, Type B - Sont 250 watt	Each	0.00	
9.1.4 (a)	Panel Type LP-PJU.FO	Each	1.00	
9.1.4 (b)	Panel Type LP-PJU.1	Each	1.00	
9.1.4 (c)	Panel Type LP-PJU.2	Each	1.00	
9.1.4 (d)	Panel Type LP-PJU.3	Each	1.00	
9.1.4 (e)	Panel Type LP-PJU.4	Each	1.00	
9.1.4 (f)	Panel Type LP-PJU.5	Each	1.00	
9.1.4 (g)	Panel Type LP-PJU.6	Each	0.00	
9.1.5 (a)	Traffic Signal Head, Type A	Each	0.00	
9.1.5 (b)	Traffic Signal Head, Type B	Each	0.00	
9.1.6	Traffic Signal Pole, Type I	Each	0.00	
9.1.7	Traffic Signal Pole, Type II	Each	0.00	
9.1.8	Cable Type - 1 (NYFGBY 2C - 2,5 mm2)	Ln M	1084.00	
9.1.9	Cable Type - 3 (NYFGBY 4C - 10 mm2)	Ln M	3322.00	
9.1.10	Cable Type - 5 (NYFGBY 4C - 25 mm2)	Ln M	1650.00	
9.1.11	Cable Type - 7 (NYFGBY 4C - 50 mm2)	Ln M	200.00	
9.1.12	Removal of Lighting Pole to stockpile	Each	0.00	
9.1.13	Removal of Lighting Signal to stockpile	Each	0.00	