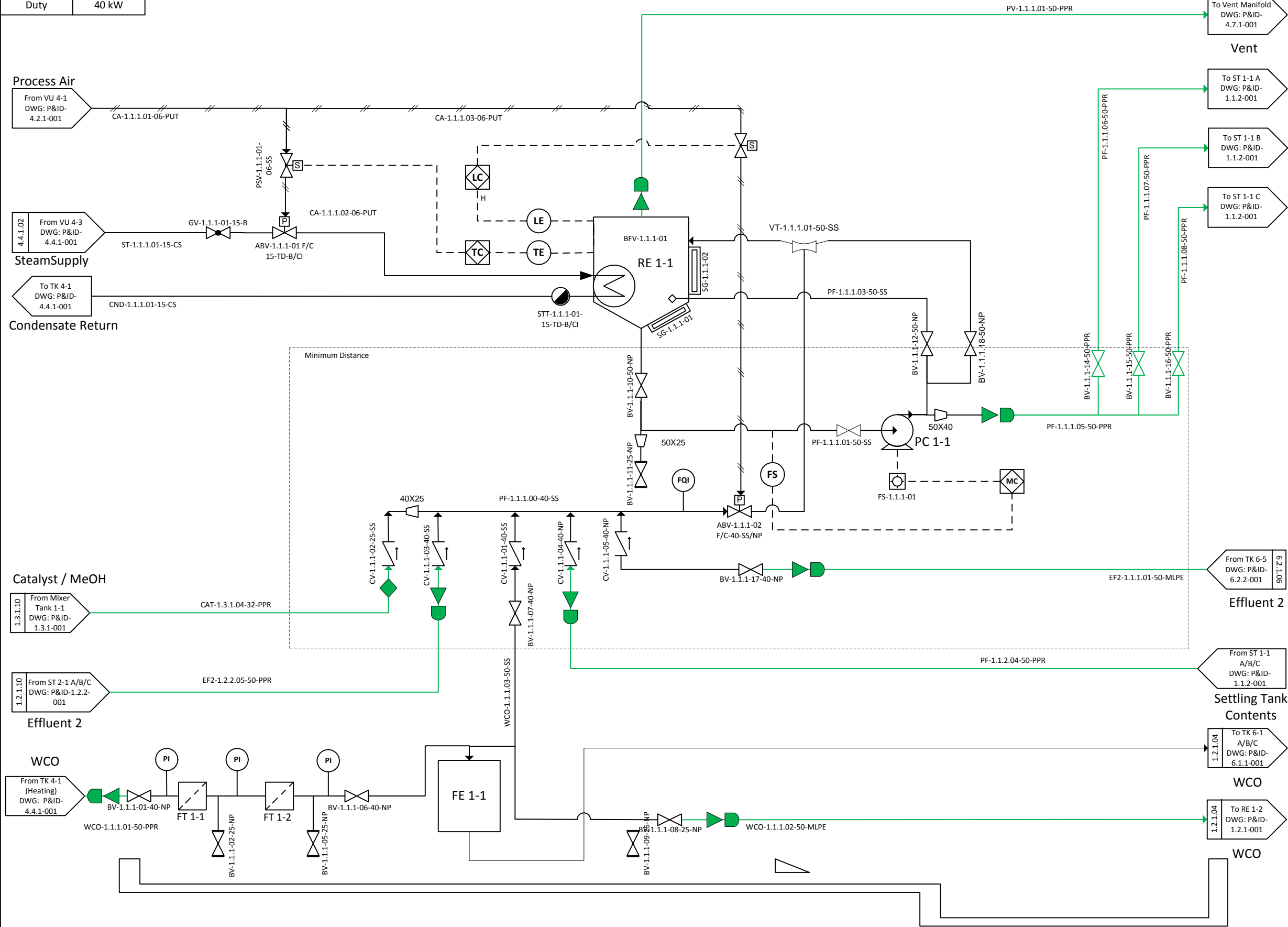


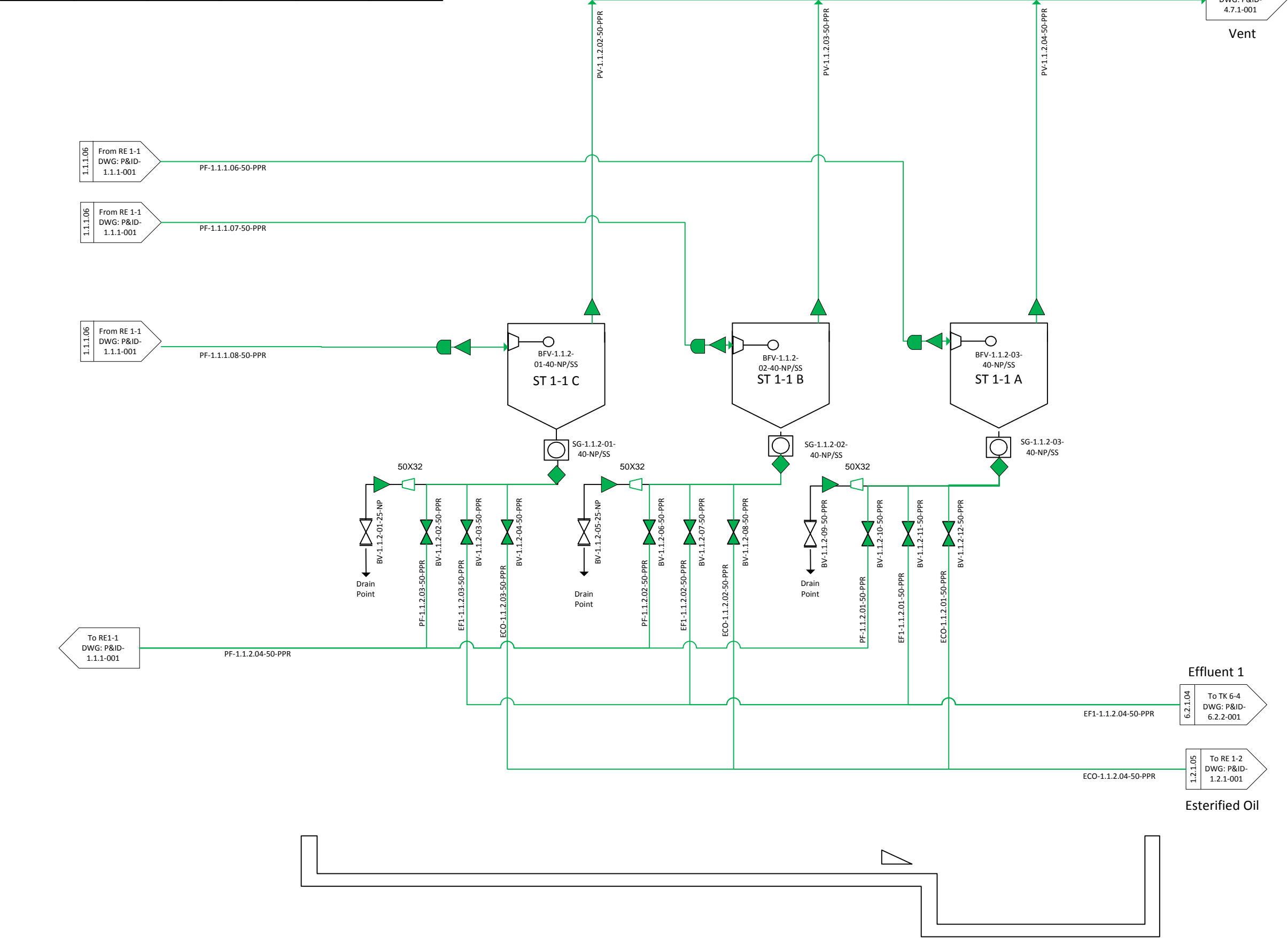
RE 1-1		FT 1-1		EX 1-1		PC 1-1	
Esterification Reactor		300 Micron		2" 10 m			
Dimensions	φ 472 cm	Dimensions	300 Micron	Dimensions	2" 10 m	Dimensions	
T-T	221	T-T	100	Duty	140 kW	Duty	4 kW
Design / Opp. P	Amb	Design / Opp. P	300 kPa	Design / Opp. T	300 kPa	Design / Opp. P	54 m/43 m
Design / Opp. T	100 / 65	Design / Opp. T	80 / 65	Design / Opp. T	100	Design / Opp. T	90/ 65
M.O.C.	SS 304	M.O.C.	55	M.O.C.	SS	M.O.C.	Cast Iron
Duty	40 kW						



- NOTES:
1. H.W.S. = Hot Water Supply
 2. H.W.R. = Hot Water Return
 3. Investigate adding Manifold and Pump to avoid staggering.
 4. Free draining on all lines.
 5. Investigate adding more filters
 6. Evaluate coil vs. frame Heat Exchanger.
 7. All HDPE Vessels operating above 60 °C are to be monitored continuously for material degradation.
 8. All reactor internals to be installed below liquid level.

LEGEND			
CODE	DESCRIPTION		
WCO	Waste Cooking Oil		
ECO	Esterified Cooking Oil		
RBD	Raw Biodiesel		
PBD	Polished Biodiesel		
BDP	Biodiesel Product		
MHO	Methanol		
CAT	Methanol Catalyst		
ADD	Biodiesel Additives		
PF	Process Fluid (Mixture)		
EF1	Effluent 1		
EF2	Effluent 2		
RG	Raw Glycerol		
CW	Cold Water		
ST	Steam		
CND	Steam Condensate		
UW	Utility Water		
PV	Process Vapour		
CA	Compressed Air		
			-
04	2016/06/29	Mid-Construction	-
03	2016/02/16	Pre-Construction	-
02	2015/12/14	Post-HAZOP	-
01	2015/12/09	Pre-HAZOP	-
00	2015/11/23	First Draft	-
REV	DATE	REVISION DESCRIPTION	APP
CLIENT:			
WP 1.1.1-Esterification			
DRAWN BY:	DATE:	SCALE:	SIZE:
MORGAN, L	2015/10/17	NTS	A3
DWG NO:	SHEET:	REV:	
iLive-P&ID-1.1.1-001	001	0G	

ST 1-1 A		ST 1-1 B		ST 1-1 C	
Dimensions	φ 387 cm	Dimensions	φ 387 cm	Dimensions	φ 387 cm
T-T	228	T-T	228	T-T	228
Design / Opp. P	Amb	Design / Opp. P	Amb	Design / Opp. P	Amb
Design / Opp. T	80 / 65	Design / Opp. T	80 / 65	Design / Opp. T	80 / 65
M.O.C.	HDPE	M.O.C.	HDPE	M.O.C.	HDPE



- NOTES:
1. H.W.S. = Hot Water Supply
 2. H.W.R. = Hot Water Return
 3. Investigate adding Manifold and Pump to avoid staggering.
 4. Free draining on all lines.
 5. Evaluate coil vs. frame Heat Exchanger.
 6. All HDPE Vessels operating above 60 °C are to be monitored continuously for material degradation.
 7. Use sight glass on settling tanks.
 8. All reactor internals to be installed below liquid level.

LEGEND	
CODE	DESCRIPTION
WCO	Waste Cooking Oil
ECO	Esterified Cooking Oil
RBD	Raw Biodiesel
PBD	Polished Biodiesel
BDP	Biodiesel Product
MHO	Methanol
CAT	Methanol Catalyst
ADD	Biodiesel Additives
PF	Process Fluid (Mixture)
EF1	Effluent 1
EF2	Effluent 2
RG	Raw Glycerol
CW	Cold Water
ST	Steam
CND	Steam Condensate
UW	Utility Water
PV	Process Vapour
CA	Compressed Air

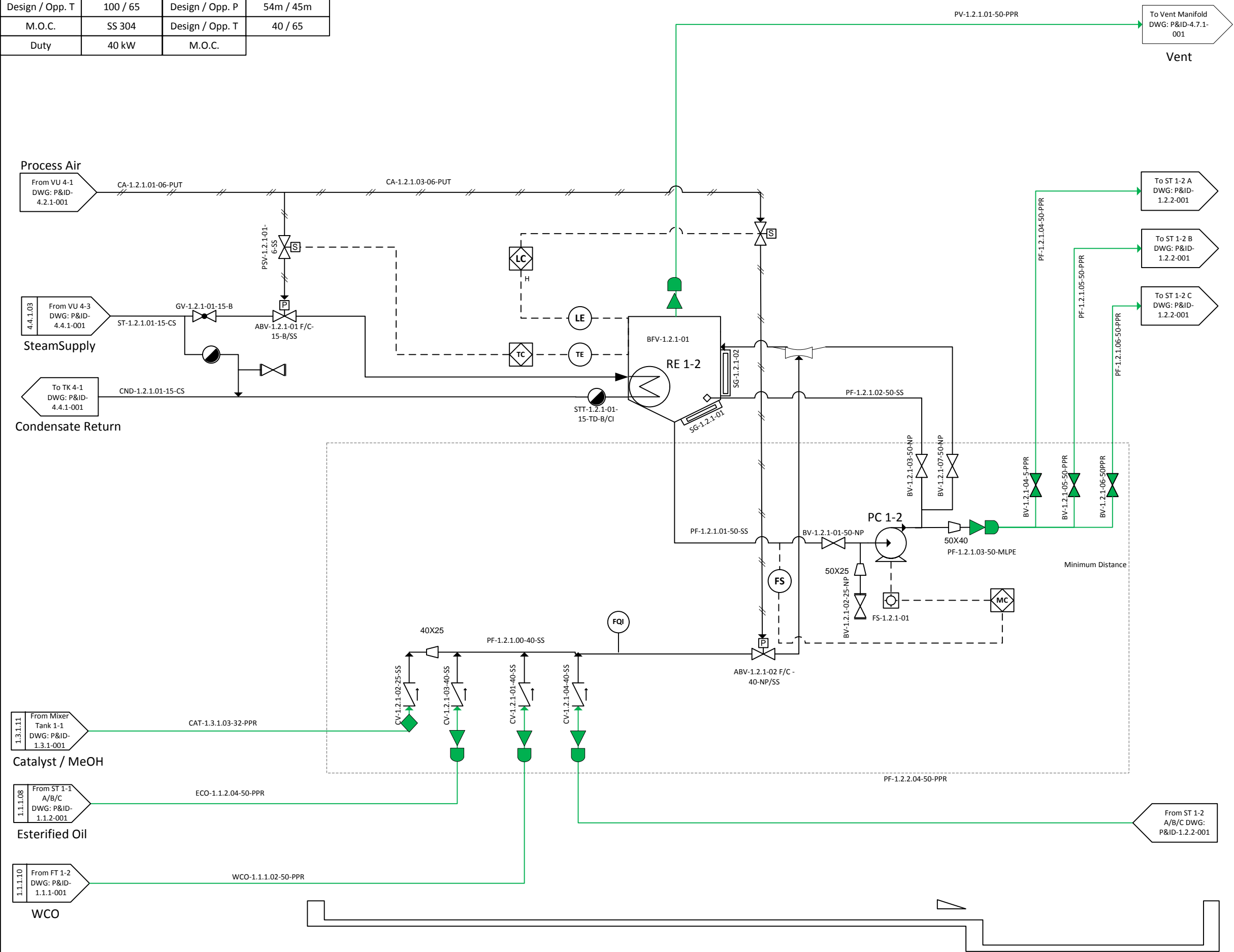
04	2016/06/30	Mid-Construction	-
03	2016/02/16	Pre-Construction	-
02	2015/12/14	Post-HAZOP	-
01	2015/12/09	Pre-HAZOP	-
00	2015/11/23	First Draft	-
REV	DATE	REVISION DESCRIPTION	APP



WP 1.1.2-Post Esterification Separation

DRAWN BY: MORGAN, L	DATE: 2015/10/17	SCALE: NTS	SIZE: A3
DWG NO: iLive-P&ID-1.1.2-001		SHEET: 001	REV: 0G

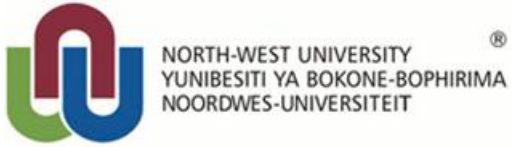
RE 1-2		PC 1-2	
Trans-Esterification Reactor			
Dimensions	ϕ 472 cm		
T-T	221	Dimensions	
Design / Opp. P	Amb	Duty	4 kW
Design / Opp. T	100 / 65	Design / Opp. P	54m / 45m
M.O.C.	SS 304	Design / Opp. T	40 / 65
Duty	40 kW	M.O.C.	



- NOTES:
1. H.W.S. = Hot Water Supply
 2. H.W.R. = Hot Water Return
 3. Investigate adding Manifold and Pump to avoid staggering.
 4. Free draining on all lines.
 5. Evaluate coil vs. frame Heat Exchanger.
 6. All HDPE Vessels operating above 60 °C are to be monitored continuously for material degradation.
 7. Use sight glass on settling tanks.
 8. All reactor internals to be installed below liquid level.

LEGEND	
CODE	DESCRIPTION
WCO	Waste Cooking Oil
ECO	Esterified Cooking Oil
RBD	Raw Biodiesel
PBD	Polished Biodiesel
BDP	Biodiesel Product
MHO	Methanol
CAT	Methanol Catalyst
ADD	Biodiesel Additives
PF	Process Fluid (Mixture)
EF1	Effluent 1
EF2	Effluent 2
RG	Raw Glycerol
CW	Cold Water
ST	Steam
CND	Steam Condensate
UW	Utility Water
PV	Process Vapour
CA	Compressed Air

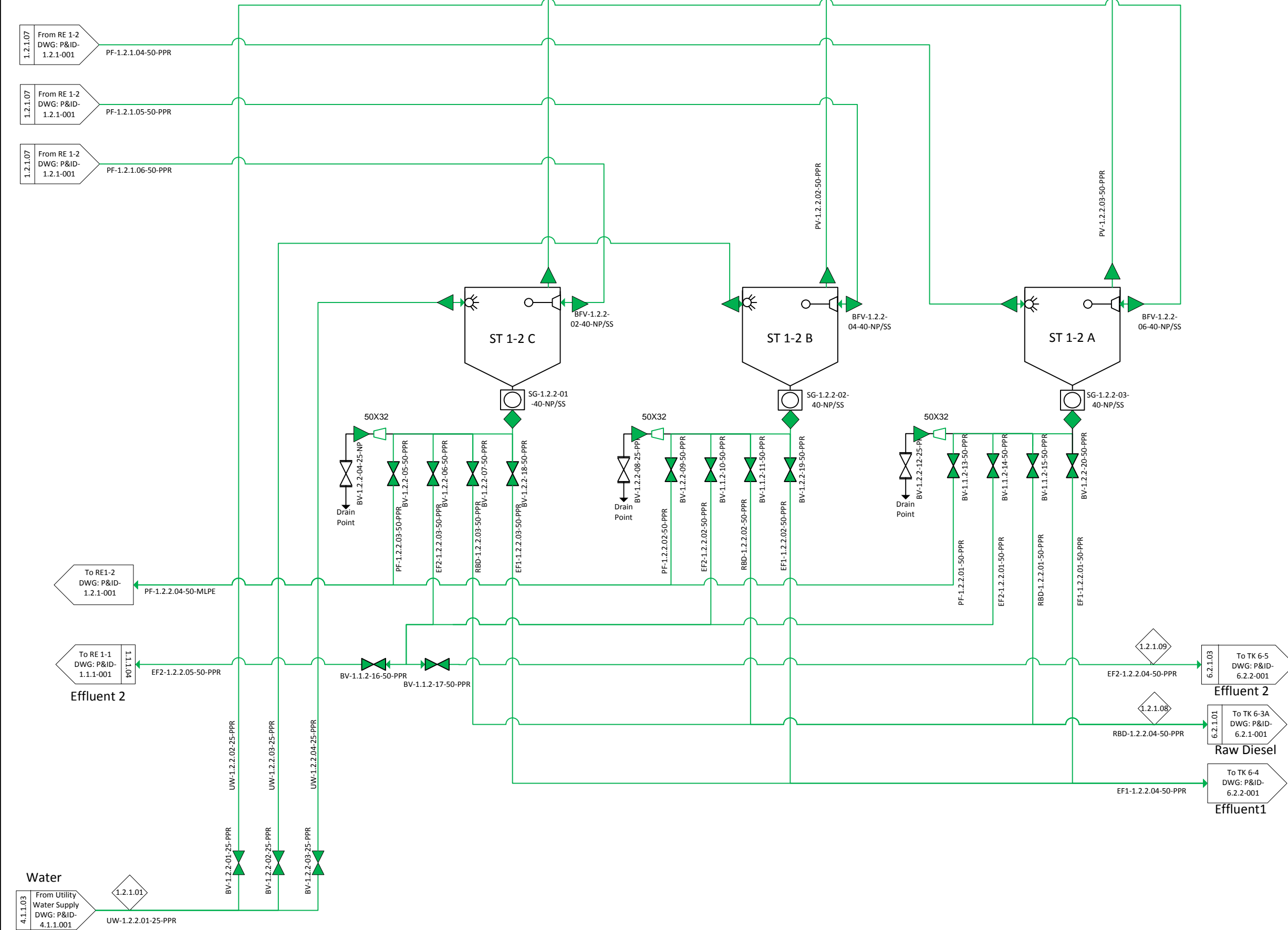
04	2016/06/29	Mid-Construction	-
03	2016/02/16	Pre-Construction	-
02	2015/12/14	Post-HAZOP	-
01	2015/12/09	Pre-HAZOP	-
00	2015/11/23	First Draft	-
REV	DATE	REVISION DESCRIPTION	APP



WP 1.2.1-Trans-Esterification

DRAWN BY: MORGAN, L	DATE: 2015/10/17	SCALE: NTS	SIZE: A3
DWG NO: iLive-P&ID-1.2.1-001	SHEET: 001	REV: 0G	

ST 1-2 A		ST 1-2 B		ST 1-2 C	
Dimensions	φ 387 cm	Dimensions	φ 387 cm	Dimensions	φ 387 cm
T-T	228	T-T	228	T-T	228
Design / Opp. P	Amb	Design / Opp. P	Amb	Design / Opp. P	Amb
Design / Opp. T	80 / 65	Design / Opp. T	80 / 65	Design / Opp. T	80 / 65
M.O.C.	HDPE	M.O.C.	HDPE	M.O.C.	HDPE



- NOTES:
1. H.W.S. = Hot Water Supply
 2. H.W.R. = Hot Water Return
 3. Investigate adding Manifold and Pump to avoid staggering.
 4. Free draining on all lines.
 5. Evaluate coil vs. frame Heat Exchanger.
 6. All HDPE Vessels operating above 60 °C are to be monitored continuously for material degradation.
 7. Use sight glass on settling tanks.
 8. All reactor internals to be installed below liquid level.

LEGEND			
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ST	Steam		
CND	Steam Condensate		
UW	Utility Water		
PV	Process Vapour		
CA	Compressed Air		

			-
04	2016/06/29	Mid-Construction	-
03	2016/02/16	Pre-Construction	-
02	2015/12/14	Post-HAZOP	-
01	2015/12/09	Pre-HAZOP	-
00	2015/11/23	First Draft	-
REV	DATE	REVISION DESCRIPTION	APP



WP 1.2.2-Post Trans-esterification Separation

DRAWN BY: MORGAN, L	DATE: 2015/10/17	SCALE: NTS	SIZE: A3
DWG NO: iLive-P&ID-1.2.2-001		SHEET: 001	REV: 0G

Acid Mixer		PC 1-3	
Dimensions	ϕ 2.2 m	Dimensions	
T-T	1.8 m	T-T	
Design / Opp. P	Amb	Design / Opp. P	10 m / 3m
Design / Opp. T	100 / 65	Design / Opp. T	80 / 65
M.O.C.	SS	M.O.C.	SS / HDPE

