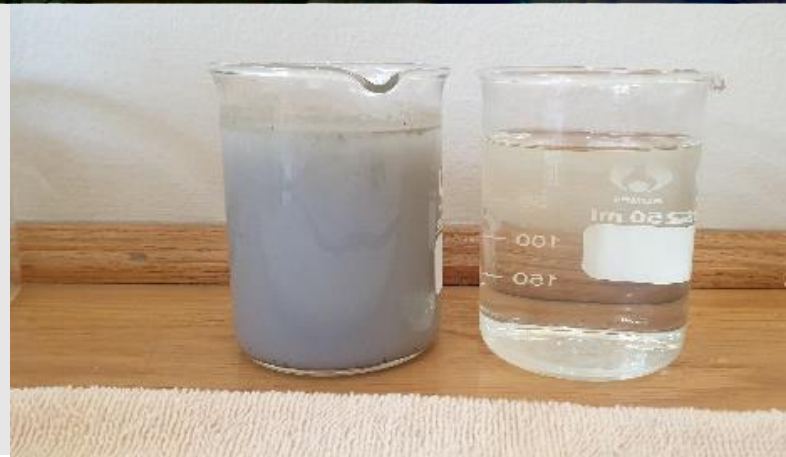




Industry – Metal Manufacturing

Location	Pretoria, South Africa
Client	Confidential
Year	2022
Application	Process effluent treatment
Contaminants	TSS, copper, Arsenic, Oil-grease etc.
Solution	Hydraspin and Hydramix



Synopsis

The South African Mint approached AHT (African Horizon Technologies Pty Ltd) to propose a solution for their emulsified effluent, to comply with environmental discharge regulations. It was established that manufacturing process require the disposal of approximately 15m³ of the combination of tramp and emulsified oil every second month in 2021, from their manufacturing processes that results from milling machines, rolling mills and presses.

Experimental Work

AHT undertook sampling, conducted a bench scale test using Hydramix CWT (Complex Water Treatment) system, based on visual observations (the milky sample on the left and the clear sample on the right) figure 1, it was evident that the test is effective in the effluent treatment prior analysis by the accredited laboratory for verification.



Figure 1: Comparison of sample before and after treatment.

Results

Hydramix CWT enhanced the break-down of emulsified oil and reduced various constituent concentrations on the effluent as per client’s objective, the raw and treated samples on figure 2 was verified by Waterlab as per the results on table 1 below.



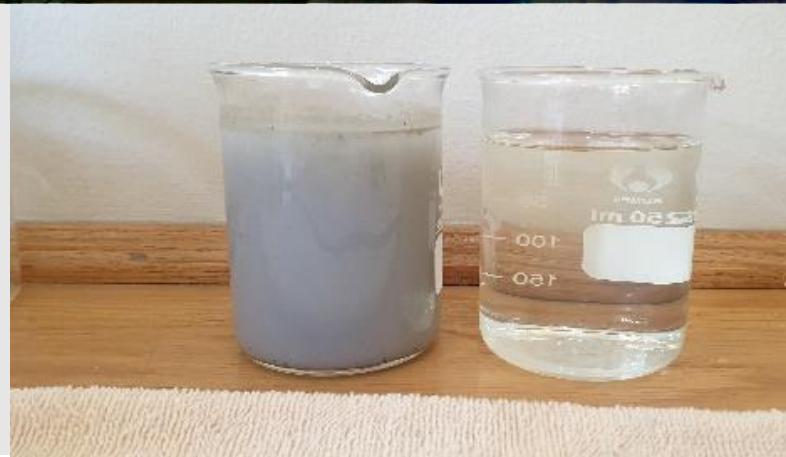
Figure 1; Raw and Treated samples of the bench test

Laboratory results of water samples are summarized in table 1, showing the reduction in %, presented in mg/l and have been compared to the City of Tshwane Metropolitan Municipality Sanitation By-laws. The certificate issued by the laboratory is demonstrated by both figure 3 and 4 images below.

The use of both the Hydraspin and Hydramix technologies illustrated over 90% reduction of Suspended Solids, Volatile Suspended Solids, Sulphides, Anionic Surfactants, Arsenic, Copper, Iron, Manganese, Zinc and Oil Grease as per certificate issued by the laboratory. That demonstrates the lowest life cycle by eradicating disposal cost to landfill and ensuring that effluent is treated onsite to comply with the discharge legislation. Results difference indicated by appendix 1, appendices 2 and 3 illustrate lab results.


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Appendix 1; Table 1, Water quality analysis in mg/l.

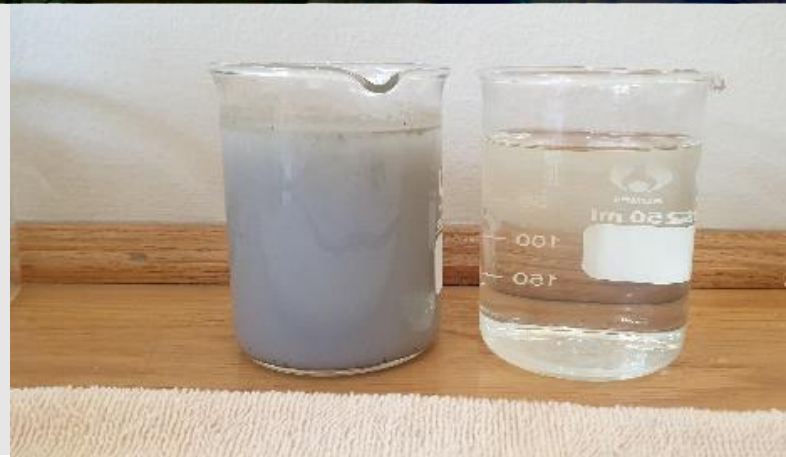
Water Quality Analysis				
Site:				
Type:	Soluble Oil			
	Raw Sample	Treated Sample 1	% Difference	Tshwane By-Laws
pH - @ 25 degC	6,9	8,3	-20	6.0 -10.0
Electrical Conductivity [mS/m]	78,8	74,5	5	500
Suspended Solids @ 105degC	673	4	99	2000
Volatile Suspended Solids @ 550degC	673	4	99	-
Non-Organic Suspended Solids @ 550degC	<1.0	<1.0	-	100
Free Residual Chlorine as Cl2	<0.1	<0.1	-	100
Total Alkalinity as CaCO3	248	204	18	-
P-Alkalinity as CaCO3	<5	<5	-	-
Hydroxide Alkalinity as CaCO3	<5	<5	-	2000
Sulphate as SO4	<2	<2	-	1800
Fluoride as F	0,2	0,2	0	5
Total Cyanide as CN	<0.07	<0.07	-	20
Sulphide as S2-	20	2	90	50
COD	6905	732	89	5000
Permanganate Value as O2	-	-	-	1400
Formaldehyde	0,149	0,122	18	50
Oil & Grease	324	8	98	500
Anionic Surfactants as MBAS	264	10	96	500
Sugar (Qualitative)	-	-	-	1500
Arsenic as As	0,014	0,001	93	*
Boron as B	6,8	5,82	14	*
Total Chromium as Cr	<0.025	<0.025	-	**
Cobalt as Co	0,749	0,502	33	**
Copper as Cu	3,95	0,042	99	**
Iron as Fe	33	1,47	96	**
Manganese as Mn	1,01	0,097	90	**
Mercury as Hg	0,001	0,002	-100	***
Nickel as Ni	1,9	1,14	40	**
Selenium as Se	0,001	<0.001	-	***
Silver as Ag	<0.025	<0.025	-	**
Titanium as Ti	<0.025	<0.025	-	**
Tungsten as W	0,436	0,147	66	**
Zinc as Zn	5,44	0,166	97	**

***Lab results are not indicative of what the system does, only the reduction from the bench test, as an illustration as per a client request.**



*Total Collection Concentration < 20 mg/l.
 **Individual Concentration <20mg/l; Total Collection Concentration <50mg/l.
 ***Individual Concentration <mg/l; Total Collection Concentration <10mg/l.


Industry – Metal Manufacturing

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Application	Process effluent treatment
Contaminants	TSS, copper, Arsenic, Oil-grease etc.
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Appendix 2 Table 2 Lab results of the treated water.

 WATERLAB (Pty) Ltd <small>Reg. No.: 196300910507 V.A.T. No.: 4130107891</small> 23B De Havilland Crescent Perseus Techno Park Meiring Naudé Drive Pretoria		 sanas <small>T0391</small>			
PRELIM CERTIFICATE OF ANALYSES GENERAL WATER QUALITY PARAMETERS					
Date received: 2021-09-27		Report number: 103966		Date completed: [blank]	
Project number: 1000				Order number: [blank]	
Client name: [blank]			Contact person: [blank]		
Address: PO Box 464, Pretoria, 0001			e-mail: [blank]		
Telephone: 012 677 2660		Facsimile: 086 649 2365		Mobile: [blank]	
Analyses in mg/l (Unless specified otherwise)	UOM %	Method ID	Maximum Allowable Limits (Tshwane By-Laws)	Sample Identification	
				Raw	Treated
Sample Number				140185	140186
Date/Time Sampled				N/A	N/A
pH - Value @ 25 °C	A 7.7	WLAB005	6.0-10.0	6.9	8.3
Electrical Conductivity in mS/m @ 25°C	A 7.0	WLAB002	500	78.8	74.5
Suspended Solids at 105°C	A 8.6	WLAB004	2000	673	4.0
Volatile Suspended Solids at 550°C	N —	WLAB028	—	673	4.0
Non-Organic Suspended Solids at 550°C	N —	WLAB028	100	<1.0	<1.0
Free Residual Chlorine as Cl ₂	N —	WLAB036	100	<0.1	<0.1
Total Alkalinity as CaCO ₃	A 10	WLAB007	—	248	204
P-Alkalinity as CaCO ₃	A 4.5	WLAB023	—	<5	<5
Hydroxide Alkalinity as CaCO ₃	A —	WLAB023	2000	<5	<5
Sulphate as SO ₄	A 8.4	WLAB046	1800	<2	<2
Fluoride as F	N —	WLAB014	5	0.2	0.2
Total Cyanide as CN	S —	—	20	<0.07	<0.07
Sulphide as S ²⁻	N —	WLAB035	50	20	2.0
Chemical Oxygen Demand as O ₂ (Total)	A 5.6	WLAB018	5000	6905	732
Permanganate Value as O ₂	N —	WLAB019	1400	Outstanding	Outstanding
Formaldehyde	S —	—	50	0.149	0.122
Oil & Grease	N —	WLAB034	500	324	8
Anionic Surfactants as MBAS	S —	—	500	254	10
Sugar (Qualitative)	N —	WLAB037	1500	Absent	Absent
Arsenic as As	A 9.6	WLAB050	**	0.014	<0.001
Boron as B	A 9.7	WLAB015	*	6.80	5.82
Total Chromium as Cr	A 7.8	WLAB015	**	<0.025	<0.025
Cobalt as Co	A 7.9	WLAB015	**	0.749	0.502
Copper as Cu	A 7.7	WLAB015	**	3.95	0.042
Iron as Fe	A 8.1	WLAB015	**	33	1.47
Manganese as Mn	A 8.3	WLAB015	**	1.01	0.097
Mercury as Hg	A 16	WLAB047	***	0.001	0.002

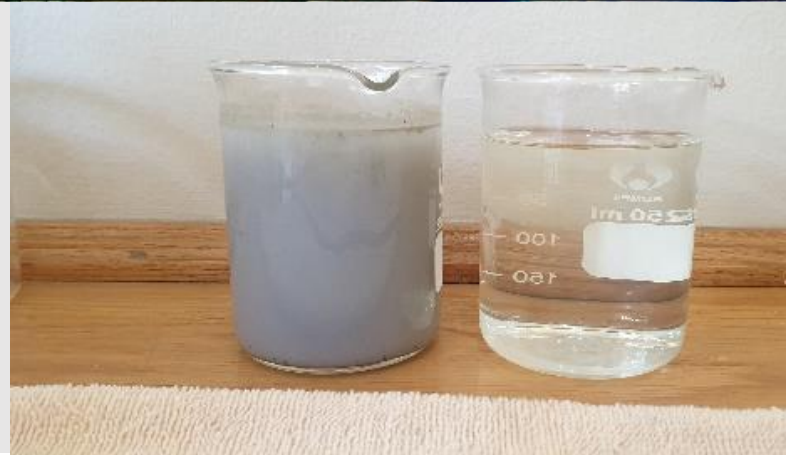
*Lab results are not indicative of what the system does, only the reduction from the bench test, as an illustration as per a client request.

A = Accredited N = Not Accredited S = Subcontracted UoM=Uncertainty Of Measurement
 Tests marked "Not SANAS Accredited" in this report are not included in the SANAS Scope of Accreditation for this Laboratory.
 Results marked "Subcontracted Test" in this report are not included in the SANAS Scope of Accreditation for this Laboratory.
 Sample condition acceptable unless specified on the report.
 The information contained in this report is relevant only to the sample/samples supplied to WATERLAB (Pty) Ltd. Any further use of the above information is not the responsibility of WATERLAB (Pty) Ltd. Except for the full report, part of this report may not be reproduced without written approval of WATERLAB (Pty) Ltd. Details of sampling conducted by WATERLAB (Pty) Ltd according to WLAB's Sampling Plan and Procedures/SOP are available on request.




Industry – Metal Manufacturing


Location	Pretoria, South Africa
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Contaminants	TSS, copper, Arsenic, Oil-grease etc.
Solution	Hydraspin and Hydramix



Appendix 3: Table 3 Lab results of the treated water.



WATERLAB (Pty) Ltd
Reg. No.: 1982009/0507 V.A.T. No.: 413010781
 23B De Havilland Crescent
 Persequor Techno Park
 Meiring Naude Drive
 Pretoria



PRELIM CERTIFICATE OF ANALYSES
GENERAL WATER QUALITY PARAMETERS

Date received: 2021-09-27		Report number: 103966		Date completed:	
Project number: 1000				Order number:	
Client name:				Contact person:	
Address: PO Box 464, Pretoria, 0001				e-mail:	
Telephone: 012 677 2660		Facsimile: 086 649 2365		Mobile:	

Analyses in mg/l (Unless specified otherwise)	UOM %	Method ID	Maximum Allowable Limits (Tehwane By-Laws)	Sample Identification	
				140185	140186
Sample Number				140185	140186
Date/Time Sampled				N/A	N/A
Nickel as Ni	A	7.7	WLAB015	**	1.90
Selenium as Se	A	0.4	WLAB050	***	0.001
Silver as Ag	N	---	WLAB015	**	<0.025
Titanium as Ti	N	---	WLAB015	**	<0.025
Tungsten as W	N	---	WLAB050	**	0.436
Zinc as Zn	A	0.0	WLAB015	**	5.44

* Total Collective Concentration <20 mg/l
 ** Individual Concentration <20 mg/l; Total Collective Concentration <50 mg/l
 *** Individual Concentration <5 mg/l; Total Collective Concentration <10mg/l

***Lab results are not indicative of what the system does, only the reduction from the bench test, as an illustration as per a client request.**

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