CLAIMS:-

1. A scour protection apparatus adapted for immersion in a body of water, the scour protection apparatus comprising:-

an inner throughbore which is adapted in use to be located around the outer circumference of a substantially tubular shaped subsea installation;

a lower most substantially planar shaped surface adapted in use to rest upon the seabed surface;

an outermost perimeter; and

an upper most surface substantially impervious to water, wherein at least a portion of the upper surface comprises at least two flow diversion means provided thereon and each flow diversion means being separated from each adjacent flow diversion means by a groove arrangement,

wherein the scour protection apparatus in use reduces seabed scour occurring around a junction of the substantially tubular shaped subsea installation and the seabed.

2. A scour protection apparatus according to claim 1, wherein the lower most planar shaped surface is a lower most planar disc shaped surface and wherein the outermost perimeter comprises an outermost generally circular circumference.

3. A scour protection apparatus according to either of claims 1 or 2, wherein the depth of the scour protection apparatus increases from the outermost perimeter towards the throughbore, such that the depth at the throughbore is greater than the depth at the outermost perimeter and the upper surface of the scour protection apparatus tapers upwardly from the outermost perimeter towards the said throughbore.

4. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is generally generally frusto-conical shaped around a central throughbore extending along its central longitudinal axis.

5. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is formed from two or more interconnecting sections which when connected together form the scour protection apparatus.

6. A scour protection apparatus according to claim 5, wherein the or each section is formed from two or more interconnecting segments which when connected together form each section of the scour protection apparatus.

7. A scour protection apparatus according to claim 6, wherein each pair of segments comprise a connection means to connect them together.

8. A scour protection apparatus according to claim 7, wherein the connection means comprise a flexible connection mechanism which securely locks two adjacent segments together and prevents them from separating apart from one another but which also permits one segment to move with respect to the other segment such that the flexible connection mechanism allows for articulation between said two adjacent segments.

9. A scour protection apparatus according to claim 8, wherein the flexible connection mechanism comprises a strapping arrangement which includes a strap arranged to be passed through a radially directed substantially linear channel formed at least partially through one portion of the segment and through a spigot formed in a segment and where the connecting strap also passes (at least partially) through at least one channel formed within a socket of an adjacent segment in order to couple the two adjacent segments together with one another and the two said channels of the adjacent segments are arranged such that, when the respective two segments are brought together, the two channels are in radial alignment such that the connecting strap is linearly arranged such that the two portions thereof which pass through the said channels are radially aligned with one another.

10. A scour protection apparatus according to claim 9, wherein the connecting strap is secured to lock the two adjacent segments together by wrapping the

connecting strap around the rest of the outer perimeter or circumference (in the radial direction) of the joint between the adjacent segments, and the two ends of the connecting strap are secured to one another by a locking means.

11. A scour protection apparatus according to any preceding claim, wherein the at least two flow diversion means provided on at least a portion of the upper surface comprise at least two rings of repeating shapes.

12. A scour protection apparatus according to claim 11, wherein each ring of repeating shapes are separated from each adjacent ring by a groove arrangement and each shape within a ring being separated from adjacent shapes by at least one groove.

13. A scour protection apparatus according to claim 12, wherein the two or more rings of repeating shapes re-directs the flow path of water flowing through the respective grooves and thereby creates significant turbulence in the water which further slows down the flow of the water.

14. A scour protection apparatus according to any of claims 11 to 13, wherein each of the repeating shapes within each ring is identical and each ring provided on the upper surface comprises identical repeating shapes to the shapes of each other ring, such that all of the shapes provided on the upper surface are identical.

15. A scour protection apparatus according to any of claims 11 to 14, wherein the majority of the upper surface comprises a hexagonal tessellation in which each three adjacent hexagons meet at each adjoining vertex and the rest of the hexagons repeat that arrangement across the majority of the upper surface of the tapered upper surface of the scour protection apparatus.

16. A scour protection apparatus according to any of claims 11 to 15, wherein a vertex between two adjacent sides of each shape comprises a radius.

17. A scour protection apparatus according to any of claims 11 to 16, wherein the arrangement of repeating shapes are arranged in rings co-axially arranged with respect to one another, such that each respectively further outer ring is arranged further downwards on the tapered upper surface and each ring comprises the same number of repeating shapes as its adjoining inner or outer ring and the shapes within all of the rings are identically sized and the groove surrounding an outer ring comprises a greater width than the width of the groove surrounding the next inner ring, such that the width of the grooves increases as the rings get further distant from the throughbore.

18. A scour protection apparatus according to any of claims 11 to 17, wherein the arrangement of hexagons on the upper surface around a ring are in the form of staggered columns equi-spaced around the diameter of the upper surface, where any one column closely fits with the next adjacent column and so on for other columns circumscribing the upper surface.

19. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is adapted to be placed around a substantially tubular shaped subsea installation which in use is secured within the seabed in a body of water.

20. A method of preventing scour around the foundations of a substantially tubular shaped subsea installation, the method comprising:-

providing a scour protection apparatus adapted for immersion in a body of water, the scour protection apparatus comprising an inner throughbore which in use is located around the outer circumference of a substantially tubular shaped subsea installation, a lower most substantially planar shaped surface adapted in use to rest upon the seabed surface, an outermost perimeter and an upper most surface; wherein at least the upper surface of the scour protection apparatus is substantially impervious to water, and at least a portion of the upper surface is provided with at least two flow diversion means thereon and each ring of repeating shapes are separated from each adjacent ring by a groove

arrangement and each shape within a ring being separated from adjacent shapes by at least one groove, and

arranging the scour protection apparatus around the outer circumference of the substantially tubular shaped subsea installation at a junction of the substantially tubular shaped subsea installation and the seabed.

21. A method according to claim 20, wherein the method further comprises lowering the scour protection apparatus from the surface of the body of water to the junction of the substantially tubular shaped subsea installation and the seabed.

22. A method according to either of claims 20 or 21, wherein the method further comprises securing the scour protection apparatus around the outer circumference of the substantially tubular shaped subsea installation at the junction of the substantially tubular shaped subsea installation and the seabed.

23. A method according to any of claims 20 to 22, wherein the method further comprises lowering the scour protection apparatus as a one piece unit from the surface of the body of water to the junction of the substantially tubular shaped subsea installation.

24. A method according to any of claims 20 to 22, wherein the method further comprises lowering the scour protection apparatus as two or more sections separately from the surface of the body of water to the junction of the substantially tubular shaped subsea installation and further comprises coupling and securing said two or more sections together around the outer circumference of the substantially tubular shaped subsea installation at the junction of the substantially tubular shaped subsea installation and the seabed.

25. A method according to claim 24, wherein the method further comprises transporting the scour protection apparatus from a manufacturing and/or storage location to an edge of the body of water separate from one another.

CLAIMS:-

1. A scour protection apparatus adapted for immersion in a body of water, the scour protection apparatus comprising:-

an inner throughbore which is adapted in use to be located around the outer circumference of a substantially tubular shaped subsea installation;

a lower most substantially planar shaped surface adapted in use to rest upon the seabed surface;

an outermost perimeter; and

an upper most surface substantially impervious to water, wherein at least a portion of the upper surface comprises at least two flow diversion means provided thereon and each flow diversion means being separated from each adjacent flow diversion means by a groove arrangement,

wherein the at least two flow diversion means provided on at least a portion of the upper surface comprise at least two rings of repeating shapes;

wherein the shapes comprise one of:-

i) a vertex between two adjacent sides of each shape comprises a radius;

ii) concave shapes such that they provide dimples in the upper surface and therefore which project into the depth of the scour protection apparatus from the upper surface; or

iii) convex shapes such that they project upwardly and outwardly from the tapered upper surface and therefore which increase the depth of the scour protection apparatus at their respective locations compared with the grooves therebetween;

and

wherein the scour protection apparatus in use reduces seabed scour occurring around a junction of the substantially tubular shaped subsea installation and the seabed.

2. A scour protection apparatus according to claim 1, wherein the lower most planar shaped surface is a lower most planar disc shaped surface and wherein

the outermost perimeter comprises an outermost generally circular circumference.

3. A scour protection apparatus according to either of claims 1 or 2, wherein the depth of the scour protection apparatus increases from the outermost perimeter towards the throughbore, such that the depth at the throughbore is greater than the depth at the outermost perimeter and the upper surface of the scour protection apparatus tapers upwardly from the outermost perimeter towards the said throughbore.

4. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is generally frusto-conical shaped around a central throughbore extending along its central longitudinal axis.

5. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is formed from two or more interconnecting sections which when connected together form the scour protection apparatus.

6. A scour protection apparatus according to claim 5, wherein the or each section is formed from two or more interconnecting segments which when connected together form each section of the scour protection apparatus.

7. A scour protection apparatus according to claim 6, wherein each pair of segments comprise a connection means to connect them together.

8. A scour protection apparatus according to claim 7, wherein the connection means comprise a flexible connection mechanism which securely locks two adjacent segments together and prevents them from separating apart from one another but which also permits one segment to move with respect to the other segment such that the flexible connection mechanism allows for articulation between said two adjacent segments.

9. A scour protection apparatus according to claim 8, wherein the flexible connection mechanism comprises a strapping arrangement which includes a strap arranged to be passed through a radially directed substantially linear channel formed at least partially through one portion of the segment and through a spigot formed in a segment and where the connecting strap also passes (at least partially) through at least one channel formed within a socket of an adjacent segment in order to couple the two adjacent segments together with one another and the two said channels of the adjacent segments are arranged such that, when the respective two segments are brought together, the two channels are in radial alignment such that the connecting strap is linearly arranged such that the two portions thereof which pass through the said channels are radially aligned with one another.

10. A scour protection apparatus according to claim 9, wherein the connecting strap is secured to lock the two adjacent segments together by wrapping the connecting strap around the rest of the outer perimeter or circumference (in the radial direction) of the joint between the adjacent segments, and the two ends of the connecting strap are secured to one another by a locking means.

11. A scour protection apparatus according to any preceding claim, wherein each ring of repeating shapes are separated from each adjacent ring by a groove arrangement and each shape within a ring being separated from adjacent shapes by at least one groove.

12. A scour protection apparatus according to claim 11, wherein the two or more rings of repeating shapes re-directs the flow path of water flowing through the respective grooves and thereby creates significant turbulence in the water which further slows down the flow of the water.

13. A scour protection apparatus according to any preceding claim, wherein each of the repeating shapes within each ring is identical and each ring provided on the upper surface comprises identical repeating shapes to the shapes of each other ring, such that all of the shapes provided on the upper surface are identical.

14. A scour protection apparatus according to any preceding claim, wherein the majority of the upper surface comprises a hexagonal tessellation in which each three adjacent hexagons meet at each adjoining vertex and the rest of the hexagons repeat that arrangement across the majority of the upper surface of the tapered upper surface of the scour protection apparatus.

15. A scour protection apparatus according to any preceding claim, wherein the arrangement of repeating shapes are arranged in rings co-axially arranged with respect to one another, such that each respectively further outer ring is arranged further downwards on the tapered upper surface and each ring comprises the same number of repeating shapes as its adjoining inner or outer ring and the shapes within all of the rings are identically sized and the groove surrounding an outer ring comprises a greater width than the width of the groove surrounding the next inner ring, such that the width of the grooves increases as the rings get further distant from the throughbore.

16. A scour protection apparatus according to claim14 or to claim 15 when dependent upon claim 14, wherein the arrangement of hexagons on the upper surface around a ring are in the form of staggered columns equi-spaced around the diameter of the upper surface, where any one column closely fits with the next adjacent column and so on for other columns circumscribing the upper surface.

17. A scour protection apparatus according to any preceding claim, wherein the scour protection apparatus is adapted to be placed around a substantially tubular shaped subsea installation which in use is secured within the seabed in a body of water.

18. A method of preventing scour around the foundations of a substantially tubular shaped subsea installation, the method comprising:-

providing a scour protection apparatus adapted for immersion in a body of water, the scour protection apparatus comprising an inner throughbore which in

use is located around the outer circumference of a substantially tubular shaped subsea installation, a lower most substantially planar shaped surface adapted in use to rest upon the seabed surface, an outermost perimeter and an upper most surface;

wherein at least the upper surface of the scour protection apparatus is substantially impervious to water, and at least a portion of the upper surface is provided with at least two flow diversion means thereon, wherein the at least two flow diversion means comprise at least two rings of repeating shapes; and

each ring of repeating shapes are separated from each adjacent ring by a groove arrangement and each shape within a ring being separated from adjacent shapes by at least one groove,

wherein the shapes comprise one of :-

i) a vertex between two adjacent sides of each shape comprises a radius;

ii) concave shapes such that they provide dimples in the upper surface and therefore which project into the depth of the scour protection apparatus from the upper surface; or

iii) convex shapes such that they project upwardly and outwardly from the tapered upper surface and therefore which increase the depth of the scour protection apparatus at their respective locations compared with the grooves therebetween; and

arranging the scour protection apparatus around the outer circumference of the substantially tubular shaped subsea installation at a junction of the substantially tubular shaped subsea installation and the seabed.

19. A method according to claim 18, wherein the method further comprises lowering the scour protection apparatus from the surface of the body of water to the junction of the substantially tubular shaped subsea installation and the seabed.

20. A method according to either of claims 18 or 19, wherein the method further comprises securing the scour protection apparatus around the outer

circumference of the substantially tubular shaped subsea installation at the junction of the substantially tubular shaped subsea installation and the seabed.

21. A method according to any of claims 18 to 20, wherein the method further comprises lowering the scour protection apparatus as a one piece unit from the surface of the body of water to the junction of the substantially tubular shaped subsea installation.

22. A method according to any of claims 18 to 20, wherein the method further comprises lowering the scour protection apparatus as two or more sections separately from the surface of the body of water to the junction of the substantially tubular shaped subsea installation and further comprises coupling and securing said two or more sections together around the outer circumference of the substantially tubular shaped subsea installation at the junction of the substantially tubular shaped subsea installation and the seabed.

23. A method according to claim 22, wherein the method further comprises transporting the scour protection apparatus from a manufacturing and/or storage location to an edge of the body of water separate from one another.